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Л. Г. Романова

PLASTICS

Учебно-методическое пособие для студентов
очного отделения факультета иностранных языков
по дисциплине
«Научно-технический перевод»

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Целью учебно-методического пособия является развитие у студентов навыков перевода специальной технической литературы, тематика которой касается пластиков, полимеров, их химических и физических свойств, разработки новых видов полимерных материалов, их влияния на окружающую среду, проблем их переработки и т.д. Издание адресовано преподавателям, ведущим занятия по дисциплине «Научно-технический перевод» (раздел «Пластики»), а также студентам 2—4 курсов английских отделений факультетов иностранных языков педвузов.

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ОГЛАВЛЕНИЕ

ПРЕДИСЛОВИЕ

Данное учебно-методическое пособие составлено в помощь преподавателям для проведения занятий по дисциплине «НАУЧНО-ТЕХНИЧЕСКИЙ ПЕРЕВОД», раздел «ПЛАСТИКИ». Материалы данного пособия могут быть использованы для проведения занятий по практическому курсу перевода английского языка, по практическому курсу английского языка, тематикам, касающимся проблем экологии, экономического развития и торговли.

Пособие предназначено для студентов 2—4 курсов английского отделения.

Целью предлагаемого учебно-методического пособия является развитие у учащихся навыков перевода специальной технической литературы, тематика которой касается пластиков, полимеров, их химических и физических свойств, разработки новых видов пластиков, их влияния на окружающую среду, проблем их переработки и т.д. Все упражнения и задания направлены на активизацию вокабуляра по изучаемой теме, а также на развитие навыков устной и письменной речи, изучение лексического материала по теме «PLASTICS», закрепление на основе изученной лексики грамматических структур, формирование навыков монологической и диалогической речи, перевода научно-популярных и специальных технических текстов, а также на работу над фонетическими аспектами языка.

Пособие может быть использовано в группах студентов различного уровня подготовки и знания английского языка, поскольку разработка к каждому тексту содержит упражнения разного уровня сложности и построена по принципу «от простого к сложному».

Согласно правилам методики преподавания английского языка, работа над каждым текстом предполагает фонетическую тренировку наиболее сложных слов, ознакомление с лексикой текста, последующее закрепление лексического материала.

Студентам предлагается творчески подойти к письменному и устному переводу текстов, к составлению диалогических и монологических высказываний с использованием изученного вокабуляра. Кроме того, учащиеся получают возможность подготовить информативные сообщения на наиболее актуальные темы в рамках изучаемого аспекта.

В пособие включены научно-популярные и специальные тексты, работа с которыми позволяет не только развивать навыки перевода технического текста, но и тщательно изучить лексику по рассматриваемой теме.

Таким образом, данное учебно-методическое пособие не только призвано способствовать повышению уровня владения английским языком, специальной лексикой, но и развивать умение студентов анализировать, обобщать прочитанное и делать логические умозаключения.

Преподаватели могут эффективно применять все предложенные задания, варьируя их по своему усмотрению, в зависимости от учебного плана, конкретных задач преподавания и языковой подготовленности студентов.

CHEMICAL ELEMENTS. PERIODIC TABLE

I. Translate, transcribe and pronounce the names of the following elements of periodic table.

H — Hydrogen
Li — Lithium
Be — Beryllium
Na — Sodium
Mg — Magnesium
He — Helium
B — Boron
C — Carbon
N — Nitrogen
O — Oxygen
F — Fluorine
NE — Neon
Al — Aluminum
Si — Silicon
P — Phosphorus
S — Sulfur
Cl — Chlorine
Ar — Argon
K — Potassium
Ca — Calcium
Sc — Scandium
Ti — Titanium
V — Vanadium
Cr — Cromium
Mn — Manganese
Fe — Iron
Co — Cobalt
Ni — Nickel
Cu — Copper
Zn — Zink
Ga — Gallium
Ge — Germanium
As — Arsenic
Se — Selenium
Br — Bromine
Cr — Krypton
Rb — Rubidium
Sr — Strontium
Y — Yttrium
Zr — Zirconium
Nb — Niobium
Mo — Molybdenum
Tc — Technetium
Ru — Ruthenium
Rh — Rhodium
Pd — Palladium
Ag — Silver
Cd — Cadmium
In — Indium
Sn — Tin
Sb — Antimony
Te — Tellurium
I — Iodin
Xe — Xenon
Cs — Cesium
Ba — Barium
La — Lathanum
Hf — Hafnium
Ta — Tantalum
W — Tungsten
Re — Rhenium
Os — Osmium
Ir — Iridium
Pt — Platinum
Au — Gold
Hg — Mercury
Tl — Thallium
Pb — Lead
Bi — Bismuth
Po — Polonium
At — Astatine
Rn — Radon
Fr — Francium
Ra — Radium
Ac — Actinium
Rf — Rutherfordium

Db — Dublium
Sg — Seaborgium
Uub — Ununbium
Uuq — Ununquadium
Ce — Cerium
Pr — Praseodymium
Nd — Neodymium
Pm — Promethium
Sm — Samarium
Eu — Europium
Gd — Gadolinium
Tb — Terbium
Dy — Dysprosium
Ho — Horbium
R — Erbium
Tm — Thulium
Yb — Ytterbium
Lu — Lutetium
Th — Actinium
Pa — Protactinium
U — Uranium
Np — Neptunium
Pu — Plutonium
Am — Americium
Cm — Curium
Bk — Berkelium
Cf — Californium
Es — Einsteinium
Fm — Fermium
Md — Mendelevium
No — Nobelium
Lr — Lawrencium

II. Transcribe and pronounce the following words.

Lawrencium, Nobelium, Mendelevium, Hydrogen, Lithium, Beryllium, Sodium, Magnesium, Helium, Boron, Carbon, Nitrogen, Oxygen, Fluorine, Neon, Aluminum, Silicon, Phosphorus, Sulfur, Chlorine, Argon, Potassium, Calcium, Scandium, Titanium, Vanadium, Cromium, Manganese, Iron, Cobalt, Nickel, Copper, Zink, Gallium, Germanium, Arsenic, Selenium, Bromine, Krypton, Rubidium, Strontium, Yttrium, Zirconium, Niobium, Molybdenum, Technetium, Ruthenium, Rhodium, Palladium, Silver, Cadmium, Indium, Tin, Antimony, Tellurium, Iodin, Xenon, Cesium, Barium, Lathanum, Hafnium, Tantalum, Tungsten, Rhenium, Osmium, Iridium, Platinum, Gold, Mercury, Thallium, Lead, Bismuth, Polonium, Astatine, Radon, Francium, Radium, Actinium, Rutherfordium, Dublium, Seaborgium, Ununbium, Ununquadium, Cerium, Praseodymium, Neodymium, Promethium, Samarium, Europium, Gadolinium, Terbium, Dysprosium, Horbium, Erbium, Thulium, Ytterbium, Lutetium, Actinium, Protactinium, Uranium, Neptunium, Plutonium, Americium, Curium, Berkelium, Californium, Einsteinium, Fermium, Mendelevium, Nobelium, Lawrencium.

III. Looking at the following symbols, give the names of the corresponding elements.

H, Li, Be, Na, Mg, He, B, C, N, O, F, Ne, Al, Si, P, S, Cl, Ar, K, Ca, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, As, Se, Br, Cr, Rb, Sr, Y, Zr, Nb, Mo, Tc, Ru, Rh, Pd, Ag, Cd, In, Sn, Sb, Te, I, Xe, Cs, Ba, La, Hf, Ta, W, Re, Os, Ir, Pt, Au, Hg, Tl, Pb, Bi, Po, At, Rn, Fr, Ra, Ac, Rf, Db, Sg, Uub, Uuq, Ce , Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, R, Tm, Yb, Lu, Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr.

IV. Translate the following words from Russian into English.

Водород, литий, бериллий, бор, углерод, азот, кислород, фтор, гелий, неон, натрий, магний, алюминий, кремний, фосфор, сера, аргон, калий, кальций, скандий, титан, ванадий, хром, марганец, железо, кобальт, никель, медь, цинк, галлий, германий, мышьяк, селен, хлор, бром, криптон, рубидий, стронций, иттрий, цирконий, ниобий, молибден, технеций, рутений, родий, палладий, серебро, кадмий, индий, олово, сурьма, теллур, йод, ксенон, цезий, барий, гафний, тантал, вольфрам, рений, осмий, иридий, платина, золото, ртуть, таллий, свинец, висмут, полоний, радон, франций, радий, курчатовий, нильсборий, лантан, церий, празеодим, неодим, прометим, самарий, европий, гадолиний, тербий, диспрозий, гольмий, эрбий, тулий, иттербий, лютеций, актиний, торий, протактиний, уран, нептуний, плутоний, америций, кюрий, берклий, калифорний, эйнштейний, фермий, менделевий, нобелий, лоуренсий.

V. Read, translate and pronounce the following English pairs of words.

Hydrogen — nitrogen; hydrogen — oxygen; oxygen — hydrogen; manganese — magnesium; lead — lithium; radon — rhodium; iron — argon; barium — boron; francium — calcium; boron — bromine; fermium — phosphorous; silicon — selenium; tantalum — thallium; thallium — gallium;

horbium — erbium; rhenium — ruthenium; tantalum — thallium; cerium — selenium; polonium — plutonium; chromium — cadmium.

VI. Read the following lines of words quickly

Boron — barium — bismuth — bromine — beryllium — berkelium;

Chlorine — calcium — copper — krypton — cadmium;

Lawrencium — Lithium — Lanthanum — lead — lutetium;

Mendelevium — magnesium — manganese — molybdenum — mercury;

Nobelium — nickel — neon — neptunium;

Oxygen — osmium;

Potassium — palladium — platinum — polonium — praseodymium — promethium — protactinium — plutonium;

Rubidium — ruthenium — rhodium — rhenium — radon — radium;

Sodium — sulfur — silicon — scandium — selenium — strontium — silver — seaborgium — samarium;

Titanium — technetium — tellurium — tantalum — tungsten — terbium — tin.

VII. Read, translate and pronounce the following Russian pairs of words

Галлий — германий; рубидий — иридий; цинк — цирконий; лютеций — лоуренсий; индий — иттрий; тулий — таллий; иттрий — итербий; галлий — гольмий; церий — цезий; бор — бром; углерод — кислород; углерод — водород; фермий — эрбий; рубидий — рутений; родий — радий; торий — рений; криптон — ксенон; тантал — лантан; галлий — таллий; эрбий — фермий.

VIII. Make up a report about radioactive elements. Speak about their chemical and physical properties

TEXT A

PLASTICS

I. Read and translate the text.

Plastics are synthetic chemicals extracted mainly from petroleum and composed of hydrocarbons (compounds made from chains of hydrogen and carbon atoms). Most plastics are polymers, long molecules made up of many repetitions of a basic molecule called a monomer; in effect, the monomers are like identical railroad cars coupled together to form a very long train. Thus, as many as 50,000 molecules of ethylene (which has two carbon atoms bonded to four hydrogen atoms) can be joined end to end into a familiar polymer called polyethylene (or polythene). The process of building polymers by adding together monomers is called additive polymerization. Another process called condensation polymerization (or polycondensation) builds up polymers by removing some atoms from each monomer so they can join together in a different way. Polyesters such as Dacron® and Terylene (two different brand names for similar materials) are made by polycondensation. Whichever process is used, the chemical properties of the monomer normally govern those of the polymer that is eventually formed.

Polymerization produces two different kinds of plastics. Sometimes, polymers form very long straight or branched chains. These are present in so-called thermoplastics, which always soften when heated and harden when cooled down. Examples include polyethylene and polystyrene. Polymers can also form more complex three-dimensional structures, which give plastics very different physical properties. Thermosetting plastics, as these are called, harden the first time they are heated when cross-links form between different plastic molecules. Thermosetting plastics never soften again no matter how many times they are heated and this makes them particularly suitable for objects that need to operate in hot environments. Epoxy resins and bakelite are examples of thermosetting plastics.

Источник: http://www.explainthatstuff.com/plastics.html

II. Write out all the words denoting chemical elements and terms from the text, find their transcriptions and Russian equivalents.

III. Translate the following word combinations from English into Russian.

Synthetic chemicals, to be extracted from, to be composed from hydrocarbons, a chain of hydrogen and carbon atoms, a polymer, a monomer, repetition of a basic molecule, polyethylene, additive polymerization, polycondensation, to build up polymers, polyester, chemical properties, straight chains, branched chains, thermoplastics, to soften when heated, to harden when cooled down, three-dimensional structures, cross-links, epoxy resins, bakelite, thermosetting plastics.

IV. Translate the following word combinations from Russian into English.

Химические свойства, полимеризация присоединением, создавать полимеры, затвердевать при охлаждении, разветвленная цепь, трехмерные структуры, размягчаться при нагревании, полиэстер, эпоксидные смолы, термореактивные пластмассы, связь между цепями, бакелит, синтезированные химические элементы, состоять из углеводородов, мономер, полимер, повторение базовой молекулы, атомы углеводорода и углерода, полиэтилен.

V. Explain the following terms using your own words.

Synthetic chemicals, to be composed from hydrocarbons, a chain of hydrogen and carbon atoms, a polymer, a monomer, additive polymerization, polycondensation, polyester, chemical properties, straight chains, branched chains, thermoplastics, to three-dimensional structures, cross-links, epoxy resins, thermosetting plastics.

VI. Translate from English into Russian.

1. **Epoxy** is either any of the basic components or the cured end products of **epoxy resins**.

Источник: https://en.wikipedia.org/wiki/Epoxy

2. A **thermoplastic**, or **thermosoftening plastic**, is a plastic material, a polymer, that becomes pliable or moldable above a specific temperature and solidifies upon cooling.

Источник: https://en.wikipedia.org/wiki/Thermoplastic

3. **Condensation polymers** are any kind of polymers formed through a condensation reaction—where molecules join together — *losing* small molecules as byproducts such as water or methanol, as opposed to addition polymers which involve the reaction of unsaturated monomers. Types of condensation polymers include polyamides, polyacetals and polyesters.

Источник: https://en.wikipedia.org/wiki/Condensation_polymer

4. **Chemical synthesis** is a purposeful execution of chemical reactions to obtain a product, or several products. This happens by physical and chemical manipulations usually involving one or more reactions. In modern laboratory usage, this tends to imply that the process is reproducible, reliable, and established to work in multiple laboratories.

Источник: https://en.wikipedia.org/wiki/Chemical_synthesis

5. **Polyethylene** (abbreviated **PE**) or **polyethene** (IUPAC name **polyethene** or **poly(methylene)**) is the most common plastic. Its primary use is in packaging (plastic bags, plastic films, geomembranes, containers including bottles, etc.). PE is usually a mixture of similar polymers of ethylene with various values.

Источник: https://en.wikipedia.org/wiki/Polyethylene

6. A **monomer** is a molecule that may bind chemically or supramolecularly to other molecules to form a (supramolecular) polymer. The process by which monomers combine to form a polymer is called polymerization. Molecules made of a small number of monomer units (up to a few dozen) are called oligomers. The term "monomeric protein" may also be used to describe one of the proteins making up a multiprotein complex.

Источник: https://en.wikipedia.org/wiki/Monomer

7. A **polymer** (Greek *poly*-, "many" + *-mer*, "parts") is a large molecule, or macromolecule, composed of many repeated subunits. Because of their broad range of properties, both synthetic and natural polymers play an essential and ubiquitous role in everyday life. Polymers range from familiar synthetic plastics such as polystyrene to natural biopolymers such as DNA and proteins that are fundamental to biological structure and function. Polymers, both natural and synthetic, are created via polymerization of many small molecules, known as monomers. Their consequently large molecular mass relative to small molecule compounds produces unique physical properties, including toughness, viscoelasticity, and a tendency to form glasses and semicrystalline structures rather than crystals.

Источник: https://en.wikipedia.org/wiki/Polymer

8. **Bakelite** is an early plastic. It is a thermosetting phenol formaldehyde resin, formed from a condensation reaction of phenol with formaldehyde. It was developed by the Belgian-American chemist Leo Baekeland in Yonkers, New York, in 1907.

Источник: https://en.wikipedia.org/wiki/Bakelite

9. One of the first plastics made from synthetic components, Bakelite was used for its electrical nonconductivity and heat-resistant properties in electrical insulators, radio and telephone casings and such diverse products as kitchenware, jewelry, pipe stems, children's toys, and firearms. The "retro" appeal of old Bakelite products has made them collectible.

Источник: https://en.wikipedia.org/wiki/Bakelite

10. Bakelite was designated a National Historic Chemical Landmark on November 9, 1993, by the American Chemical Society in recognition of its significance as the world's first synthetic plastic.

Источник: https://en.wikipedia.org/wiki/Bakelite

11. **Carbon** (from Latin: *carbo* "coal") is a chemical element with symbol **C** and atomic number 6. It is nonmetallic

and tetravalent — making four electrons available to form covalent chemical bonds. Three isotopes occur naturally, ^{12}C and ^{13}C being stable, while ^{14}C is a radioactive isotope, decaying with a half-life of about 5,730 years. Carbon is one of the few elements known since antiquity.

Источник: https://en.wikipedia.org/wiki/Carbon

12. **Hydrogen** is a chemical element with chemical symbol **H** and atomic number 1. Hydrogen is the lightest element on the periodic table. The most common isotope of hydrogen, termed *protium*, has one proton and no neutrons.

Источник: http://www.idc-online.com/technical_references/pdfs/chemical_engineering/Hydrogen.pdf

13. An **addition polymer** is a polymer which is formed by an addition reaction, where many monomers bond together via rearrangement of bonds *without* the loss of any atom or molecule under specific condition of heat, pressure, catalyst. This is in contrast to a condensation polymer which is formed by a condensation reaction where a molecule, usually water, *is* lost during the formation.

Источник: https://en.wikipedia.org/wiki/Addition_polymer

14. **Polyester** is a category of polymers that contain the ester functional group in their main chain. As a specific material, it most commonly refers to a type called polyethylene terephthalate (PET). Polyesters include naturally occurring chemicals, such as in the cutin of plant cuticles, as well as synthetics through step-growth polymerization such as polybutyrate. Natural polyesters and a few synthetic ones are biodegradable, but most synthetic polyesters are not. This material is used very widely in clothing.

Источник: https://ru.scribd.com/document/269462895/Polyester

15. A **cross-link** is a bond that links one polymer chain to another. They can be covalent bonds or ionic bonds. "Polymer chains" can refer to synthetic polymers or natural polymers (such as proteins). When the term "cross-linking" is used in the

synthetic polymer science field, it usually refers to the use of cross-links to promote a difference in the polymers' physical properties. When "crosslinking" is used in the biological field, it refers to the use of a probe to link proteins together to check for protein-protein interactions, as well as other creative cross-linking methodologies.

Источник: https://en.wikipedia.org/wiki/Cross-link

16. Cross-linking is used in both synthetic polymer chemistry and in the biological sciences. Although the term is used to refer to the "linking of polymer chains" for both sciences, the extent of crosslinking and specificities of the crosslinking agents vary. Of course, with all science, there are overlaps, and the following delineations are a starting point to understanding the subtleties.

Источник: https://en.wikipedia.org/wiki/Cross-link

17. When cross links are added to long rubber molecules, the flexibility decreases, the hardness increases and the melting point increases as well.

Источник: https://en.wikipedia.org/wiki/Cross-link

VII. Fill in the gaps.

1. … are bounds between polymer chains.
2. … is a synthetic material that is widely used in clothing manufacturing.
3. … is a chemical element from which coal consists of.
4. … is a specific process when many monomers are connected together under certain conditions.
5. … is a macromolecule composed of composed of many repeated subunits.
6. … is a mixture of similar polymers which is widely used in packaging.
7. … is a molecule forming polymers by repetition.
8. … is a plastic material which becomes pliable under certain conditions.

9.… is a purposeful execution of chemical reactions to get a certain product.

10. … is an early plastic composed in 1907.

VIII. Translate from Russian into English.

1. Полимеризация — это ряд искусственно проведенных химических реакций, в результате которых создаются два различных вида пластмассы.

2. Полимеры компонуются из длинных цепей базовых элементов, названных мономерами.

3. Большинство пластиков являются полимерами. Процесс создания пластика за счет присоединения базовых элементов — мономеров, называется полимеризацией, присоединением.

4. Реакция поликонденсации — это процесс построения полимеров за счет вытеснения некоторых атомов мономеров, в результате чего они могут присоединяться различными способами.

5. Термопласты — это вид пластика, который становится мягким при нагревании и затвердевает при охлаждении.

6. Разветвленные структуры молекул способны формировать трехмерные образования.

7. Химические свойства мономеров, формирующих полимеры, обычно определяют химические свойства скомпонованных из них полимеров.

IX. Make up 10 sentences about plastics and their chemical and physical properties in English for your fellow-students to translate.

X. Act out a monologue of a professor of chemistry in Russian for your fellow-students to translate into English. Speak about plastics and their physical and chemical properties.

XI. Make up Russian-English dialogues for your groupmates to translate:

- Two owners of a plant discussing plastics as materials and their basic properties;

- a Russian and an English student of the department of chemistry speaking about properties and peculiarities of different plastics and polymers;

- two businessmen who want to start their own plant producing plastic goods;

- two proprietors trading plastic goods and discussing their peculiarities.

TEXT B

Manufacture of plastics

I. Read and translate the following text.

Plastic goods such as hosepipes or washing-up bowls begin life as a raw material, or resin, produced by polymerization. Initially, the resin starts off as a powder, or as pellets or flakes, to which various other materials are added. Some of these provide color or texture, while others give the plastic particular physical properties, such as fire-resistance, slight electrical conductivity (to reduce static buildup), or added strength. Additives called plasticizers make a plastic flow more easily while stabilizers called antioxidants help to prevent it from breaking down over time, for example, through the effect of the ultraviolet radiation in sunlight.

Once the raw material has been prepared, the final product is produced through a range of different manufacturing processes. Extrusion involves squeezing plastic like toothpaste through a mold and is used to make goods such as hosepipes and polyethylene sheets. Injection molding involves heating resin pellets until they melt, then forcing them under pressure into a mold, where they cool and harden to make objects such as plastic telephones or toy cars. A similar technique called blow molding makes plastic bottles by forcing a thin layer of

plastic against the mold with compressed air. Casting is used to shape thermosetting plastics by pouring them into a mold then heating them until they set. And calendaring involves squeezing sheets of plastic between huge rollers to make thin, flexible materials such as plastic folders.

Источник: http://www.explainthatstuff.com/plastics.html

II. Write out all the words denoting chemical elements and terms from the text, find their transcriptions and Russian equivalents.

III. Translate the following word combinations from English into Russian.

Plastic goods, raw material, resin, polymerization, pellets, flakes, fire-resistance, static buildup, slight electrical conductivity, additives, plasticizers, plastic flow, stabilizers, antioxidants, ultraviolet radiation, extrusion, mold, hosepipes, polyethylene sheets, injection molding, to force smth under pressure, blow molding, compressed air, casting, to pour smth into a mold, to set, calendering, rollers, flexible, a plastic folder.

IV. Translate the following word combinations from Russian into English.

Пластичный, пластиковые изделия, пластиковая папка, матрица, сжатый воздух, ультрафиолетовое излучение, полимеризация, сырье, смола, гранулы, огнестойкость, статическое электричество, стружка, присадочные материалы, невысокая электропроводность, пластификаторы, каландрирование, стабилизаторы, пластическая деформация, литье под давлением, валы, ингибиторы, литье, заливать в матрицу, выдувное формование, шланги, застывать, полиэтиленовые листы.

V. Explain the following terms using your own words.

Plastic goods, raw material, resin, polymerization, pellets, flakes, fire-resistance, static buildup, slight electrical

conductivity, additives, plasticizers, stabilizers, antioxidants, ultraviolet radiation, extrusion, mold, polyethylene sheets, injection molding, to force smth under pressure, blow molding, casting, to pour smth into a mold, to set, calendering, flexible.

VI. Translate from English into Russian.

1. A **fire-resistance rating** typically means the duration for which a passive fire protection system can withstand a standard fire resistance test. This can be quantified simply as a measure of time, or it may entail a host of other criteria, involving other evidence of functionality or fitness for purpose.

Источник: http://www.gpedia.com/en/gpedia/Fire-resistance_rating

2. **Extrusion** is a process used to create objects of a fixed cross-sectional profile. A material is pushed through a die of the desired cross-section. The two main advantages of this process over other manufacturing processes are its ability to create very complex cross-sections, and to work materials that are brittle, because the material only encounters compressive and shear stresses. It also forms parts with an excellent surface finish.

Источник: https://en.wikipedia.org/wiki/Extrusion

3. **Static electricity** is an imbalance of electric charges within or on the surface of a material. The charge remains until it is able to move away by means of an electric current or electrical discharge. Static electricity is named in contrast with current electricity, which flows through wires or other conductors and transmits energy.

Источник: https://plus.google.com/+ColinSullender/posts/DArhVyB8xoC

4. A static electric charge can be created whenever two surfaces contact and separate, and at least one of the surfaces has a high resistance to electric current (and is therefore an electrical insulator). The effects of static electricity are familiar to most people because people can feel, hear, and even see the spark as the excess charge is neutralized when brought close to

a large electrical conductor (for example, a path to ground), or a region with an excess charge of the opposite polarity (positive or negative). The familiar phenomenon of a static shock — more specifically, an electrostatic discharge-is caused by the neutralization of charge.

Источник: https://plus.google.com/+ColinSullender/posts/DArhVyB8xoC

5. **Plasticizers** (UK: **plasticisers**) or **dispersants** are additives that increase the plasticity or viscosity of a material. Over the last 60 years more than 30,000 different substances have been evaluated for their plasticizing properties. Of these, only a small number — approximately 50 — are today in commercial use. The dominant applications are for plastics, especially polyvinyl chloride (PVC). The properties of other materials are also improved when blended with plasticizers including concrete, clays, and related products.

Источник: https://en.wikipedia.org/wiki/Plasticizer

6. A polyethylene sheet is a plastic film made from one of the most commonly used plastics. Like all plastics, polyethylene is a petroleum product. It is a very strong plastic that can be found in items ranging from shopping bags to bulletproof vests. When made thin, this material is more properly called polyethylene film. These films are normally translucent, although they can be made opaque with the use of additives.

Источник: http://www.wisegeek.org/what-is-a-polyethylene-sheet.htm

7. Injection moulding is a manufacturing process for producing parts by injecting material into a mould. Injection moulding can be performed with a host of materials mainly including metals, (for which the process is called die-casting), glasses, elastomers, confections, and most commonly thermoplastic and thermosetting polymers. Material for the part is fed into a heated barrel, mixed, and forced into a mould cavity, where it cools and hardens to the configuration of the cavity. After a product is designed, usually by an industrial designer or an engineer, moulds are made by a mould-maker

(or toolmaker) from metal, usually either steel or aluminium, and precision-machined to form the features of the desired part. Injection moulding is widely used for manufacturing a variety of parts, from the smallest components to entire body panels of cars. Advances in 3D printing technology, using photopolymers which do not melt during the injection moulding of some lower temperature thermoplastics, can be used for some simple injection moulds.

Источник: https://www.plastics-technology.com/articles/id/injection moulding

8. Parts to be injection moulded must be very carefully designed to facilitate the moulding process; the material used for the part, the desired shape and features of the part, the material of the mould, and the properties of the moulding machine must all be taken into account. The versatility of injection moulding is facilitated by this breadth of design considerations and possibilities.

Источник: https://www.plastics-technology.com/articles/id/injection moulding

9. **Blow molding** is a manufacturing process by which hollow plastic parts are formed. In general, there are three main types of blow molding: extrusion blow molding, injection blow molding, and injection stretch blow molding. The blow molding process begins with melting down the plastic and forming it into a parison or in the case of injection and injection stretch blow moulding (ISB) a preform. The parison is a tube-like piece of plastic with a hole in one end through which compressed air can pass.

Источник: https://en.wikipedia.org/wiki/Blow_molding

10. The parison is then clamped into a mold and air is blown into it. The air pressure then pushes the plastic out to match the mold. Once the plastic has cooled and hardened the mold opens up and the part is ejected.

Источник: https://en.wikipedia.org/wiki/Blow_molding

VII. Fill in the gaps.

1. … for manufacturing plastics is produced in flakes, powder or pellets.

2. … give plastics extra colour and other different properties.

3. … help to prevent breaking of plastic goods.

4. …is squeezing plastic through a mold.

5. …is forcing heated plastic into a mold.

6. …is forcing a thin layer of plastic into a mold with the help of compressed air.

7. … is pouring heated plastic into a mold.

8. … is squeezing a thin layer of plastic between rollers.

VIII. Translate from Russian into English.

1. Присадочные материалы применяют при производстве пластиковых изделий для того, чтобы придать им различные физические свойства.

2. Сырьем для производства изделий из пластика служит смола, выпускаемая для удобства в форме стружки, гранул или порошка.

3. Процесс выдувного формирования применяют при производстве полых емкостей из пластика — бутылок например.

4. Полиэтиленовая пленка изготавливается за счет прокатывания пластикового листа между валами.

5. При производстве цельных изделий из пластика применяют литье. Горячий пластик заливается в матрицу и застывает, принимая ее форму.

6. Некоторым изделиям из пластика свойственны такие физические свойства, как огнестойкость, низкая электропроводность и устойчивость к ультрафиолетовому излучению.

IX. Make up 10 sentences about plastics, ways of producing them and their chemical and physical properties in English for your fellow-students to translate.

X. Act out a monologue of a professor of chemistry in Russian for your fellow-students to translate into English.

Speak about plastics, ways of producing them and their physical and chemical properties.

XI. Make up Russian-English dialogues for your group-mates to translate:

- Two owners of a plant discussing plastics as materials, ways of producing them and their physical and chemical properties;
- a Russian and an English student of the department of chemistry speaking about properties and peculiarities of different plastics and polymers, ways of producing them;
- two businessmen who want to start their own plant producing plastic goods;
- two proprietors trading plastic goods and discussing their peculiarities, ways of production.

TEXT C

Uses of plastics

I. Read and translate the text.

Starting with celluloid, invented in the 1860s, and bakelite, patented in 1909, chemists have now synthesized dozens of different "poly" plastics for almost every conceivable use (the word "poly" in front a chemical name simply indicates that a plastic has been formed by polymerization). Polyethylene gives us food wrapping, carrier bags, greenhouse materials, and plastic bottles. Polypropylene is easily drawn into strong fibers and woven into ropes and carpets. Polystyrene is a light packaging material with particularly good heat insulation properties (hence its use in styrofoam cups). Polyvinylchloride (PVC) is a cheap and versatile plastic that can be formed into a wide range of items, including imitation leather, "vinyl" records, and plastic pipes. And polytetrafluoroethylene (PTFE) or Teflon is a slippery heat- and chemical-resistant plastic used as the non-stick coating in frying pans.

Plastic is such a dominant feature of the modern world that it seems almost impossible to imagine it being more pervasive than it already is. Yet chemists continue to pioneer improved methods of polymerization and continually produce revolutionary new plastic materials. Plastic-based composites have long been used to manufacture car components, but manufacturers such as Chrysler are now looking to produce car bodies built purely from plastics such as PET (polyethylene terephthalate) — a material commonly used to make plastic bottles. Chrysler claim the plastic shells are as crash-resistant as steel and composites, but much cheaper. Their new plastic process could reduce the number of body parts from around 80 to just 6, eliminate the need for painting (because the plastic body can be colored when it is molded), and could halve the cost of some conventional cars.

Other new plastics promise a range of different benefits. One of the latest developments, light-emitting polymers (LEPs), could replace cathode ray tubes and expensive flat-panel LCD displays. Where today's tiny semiconductor lasers (used in appliances such as CD-players) can produce light of only certain colors, LEPs can make light of any color and are much easier to manufacture. A more controversial development has been the use of a bacteria-killing plastic called Microban® in food chopping boards and in plastic toys. The manufacturers have claimed superior resistance against bacteria, but environmental regulators and consumer watchdogs have expressed doubts and concerns. One of the most unusual new plastics is a polymer called 3GT, which has been long in development but is still not commercially marketed. It has a kind of "stretch memory," so it could be used to make seats that remember the shapes of their occupants or clothes that mold to peoples' bodies. Another amazing plastic called D3O® has an astonishing ability to absorb impacts: normally it's soft and squishy, but if you hit it very suddenly, it hardens instantly and cushions the blow. (Find out more about it in our article on energy-absorbing materials.)

For all their benefits, plastics do present a notable problem: their sheer durability means they persist in the environment for many years, while their lightness means they can be carried great distances, for example as ocean debris. The bodies of fully a quarter of the world's seabirds are estimated to contain some sort of plastic residue. Waste plastics such as PET are now recycled into a range of useful goods, such as upholstery padding and thermal clothing. Unlike other plastics, which are produced from petroleum, polyhydroxybutyrate (PHB), sold as Biopol, is produced as a natural polymer by certain bacteria as a means of storing their energy. It breaks down harmlessly in soil, but is much more expensive than other plastics. You can read more about environmentally friendly plastics in our detailed article about bioplastics.

Источник: http://www.explainthatstuff.com/plastics.html

II. Write out all the words denoting chemical elements and terms from the text, find their transcriptions and Russian equivalents.

III. Translate the following word combinations from English into Russian.

To be patented, conceivable use, fibers, to be woven into ropes, heat insulation properties, Styrofoam cups, versatile plastic, imitation leather, slippery-heat and chemical-resistant plastic, non-stick coating, dominant feature, pervasive, to pioneer improved methods, polyethylene terephthalate, crash-resistant, to be colored when molded, conventional cars, light-emitting polymers, cathode ray tubes, flat-panel, semiconductor lasers, food chopping boards, resistance against bacteria, environmental regulators, consumer watchdogs, stretch memory, to mold to people’s bodies, to absorb impacts, soft and squishy, energy-absorbing materials, sheer durability, to persist in the environment, ocean debris, residue, upholstery padding, thermal clothing, petroleum, polyhydroxybutyrate, break down harmlessly in soil, environmentally friendly plastics.

IV. Translate the following word combinations from Russian into English.

Безвредно разлагаться в почве, основная черта, экологически безопасный пластик, модернизировать испытанные временем методы, продукты нефтепереработки, повторять формы человеческого тела, полигидроксибутирата, термоодежда, получить патент, обивочный материал, всевозможные варианты применения, кожезаменитель, волокна, отходы, свиваться в веревки, мусор в океане, мягкий и вязкий, термоустойчивость, чашки из пенополистерола, противостоящий удару при столкновении, окрашиваться при изготовлении, плоская панель, доска для резки продуктов, полупроводниковый лазер, светоизлучающие полимеры, многофукциональный пластик, организация по защите прав потребителей, сохранение формы, нейтрализовать последствия, энергопоглощающие материалы, сохраняться в окружающей среде, антипригарное покрытие, обычные машины, антибактериальные свойства, пластик с антискользящими, антибактериальными и термостойкими свойствами; электронно-лучевые трубки, долговечность, полиэтилентерефталат.

V. Explain the following terms using your own words.

Conceivable use, fibers, to be woven into ropes, heat insulation properties, versatile plastic, imitation leather, slippery-heat and chemical-resistant plastic, non-stick coating, pervasive, to pioneer improved methods, crash-resistant, to be colored when molded, conventional cars, light-emitting polymers, cathode ray tubes, flat-panel, food chopping boards, resistance against bacteria, environmental regulators, consumer watchdogs, stretch memory, to mold to people's bodies, to absorb impacts, soft and squishy, energy-absorbing materials, sheer durability, to persist in the environment, ocean debris, residue, upholstery padding, thermal clothing, petroleum, break down harmlessly in soil, environmentally friendly plastics.

VI. Translate the following sentences from English into Russian.

1. Technically there are no any environmentally friendly plastics, because even those ones, which break down harmlessly in soil, leave components, which persist in the environment.

Источник: https://www.megaessays.com/viewpaper/19237.html

2. There are slippery, heat and chemical — resistant plastics which are widely used in producing high-tech devices.

Источник: http://www.explainthatstuff.com/plastics.html

3. **Polyhydroxybutyrate** (**PHB**) is a polyhydroxyalkanoate (PHA), a polymer belonging to the polyesters class that are of interest as bio-derived and biodegradable plastics.

Источник: https://en.wikipedia.org/wiki/Polyhydroxybutyrate

4. **Environmental law** — or "environmental and natural resources law" — is a collective term describing the network of treaties, statutes, regulations, common and customary laws addressing the effects of human activity on the natural environment.

Источник: https://en.wikipedia.org/wiki/Environmental_law

5. **Consumer Watchdog** (formerly the Foundation for Taxpayer and Consumer Rights) is a non-profit, progressive organization which advocates for taxpayer and consumer interests, with a focus on insurance, health care, political reform, privacy and energy.

Источник: https://en.wikipedia.org/wiki/Consumer_Watchdog

6. The organization was founded in 1985 by California Proposition 103 author Harvey Rosenfield and is headquartered in Santa Monica, California. Its chief officers include President Jamie Court and Executive Director Douglas Heller. Other notable staff include consumer advocate John Simpson.

Источник: https://en.wikipedia.org/wiki/Consumer_Watchdog

7. **Thermal insulation** is the reduction of heat transfer (the transfer of thermal energy between objects of differing temperature) between objects in thermal contact or in range of radiative influence. Thermal insulation can be achieved with specially engineered methods or processes, as well as with suitable object shapes and materials.

Источник: https://en.wikipedia.org/wiki/Thermal_insulation

8. Heat flow is an inevitable consequence of contact between objects of differing temperature. Thermal insulation provides a region of insulation in which thermal conduction is reduced or thermal radiation is reflected rather than absorbed by the lower-temperature body.

Источник: https://en.wikipedia.org/wiki/Thermal_insulation

9. An **organic light-emitting diode** (**OLED**) is a light-emitting diode (LED) in which the emissive electroluminescent layer is a film of organic compound that emits light in response to an electric current. This layer of organic semiconductor is situated between two electrodes; typically, at least one of these electrodes is transparent. OLEDs are used to create digital displays in devices such as television screens, computer monitors, portable systems such as mobile phones, handheld game consoles and PDAs. A major area of research is the development of white OLED devices for use in solid-state lighting applications.

Источник: https://en.wikipedia.org/wiki/OLED

10. In physics, **absorption** of electromagnetic radiation is the way in which the energy of a photon is taken up by matter, typically the electrons of an atom. Thus, the electromagnetic energy is transformed into internal energy of the absorber, for example thermal energy. The reduction in intensity of a light wave propagating through a medium by absorption of a part of its photons is often called attenuation. Usually, the absorption of waves does not depend on their intensity (linear absorption),

although in certain conditions (usually, in optics), the medium changes its transparency dependently on the intensity of waves going through, and saturable absorption (or nonlinear absorption) occurs.

Источник: https://en.wikipedia.org/wiki/Absorption_(electromagnetic_radiation)

VII. Fill in the gaps.

1. … is a trademarked brand of closed-cell extruded polystyrene foam currently made for thermal insulation and craft applications. It is owned and manufactured by The Dow Chemical Company.

2. … is a vacuum tube that contains one or more electron guns and a phosphorescent screen, and is used to display images.

3. … or laser diodes play an important part in our everyday lives by providing cheap and compact-size lasers. They consist of complex multi-layer structures requiring nanometer scale accuracy and an elaborate design.

4. … **displays** are electronic viewing technologies used to enable people to see content (still images, moving images, text, or other visual material) in a range of entertainment, consumer electronics, personal computer, and mobile devices, and many types of medical, transportation and industrial equipment.

5. … is a naturally occurring, yellow-to-black liquid found in geological formations beneath the Earth's surface, which is commonly refined into various types of fuels. Components of petroleum are separated using a technique called fractional distillation.

6. … is a natural or synthetic substance that is significantly longer than it is wide.

7. … is a surface engineered to reduce the ability of other materials to stick to it.

VIII. Translate from Russian into English.

1. Пластики с антибактериальными свойствами применяются при производстве игрушек и кухонных досок.

2. Все виды пластика отличаются исключительной долговечностью. Они подолгу не разлагаются в почве, и поэтому бессмысленно говорить об экологически безвредных видах пластика.

3. Продукты нефтепереработки представляют собой материал для производства пластика.

4. Современная промышленность производит некоторые виды пластика, которые отличаются исключительной ударостойкостью, при этом они гораздо прочнее стали. Это делает производство автомобилей значительно дешевле.

5. При производстве современной мебели применяют некоторые виды пластика, способные принимать и запоминать очертания тела человека, что значительно упрощает производство некоторого оборудования и мебели для лечебных учреждений.

6. Современные обивочные ткани, а также кожезаменитель производятся на основе полимеров, что делает их долговечными и прочными.

7. Все современные упаковочные материалы производятся на полимерной основе.

8. Термостойкий пластик незаменим при производстве защитной одежды.

IX. Make up 10 sentences about plastics and their chemical and physical properties in English for your fellow-students to translate.

X. Act out a monologue of a professor of chemistry in Russian for your fellow-students to translate into English. Speak about plastics, their physical and chemical properties, the problems of their degrading in the environment and environmental pollution.

XI. Make up Russian-English dialogues for your groupmates to translate:

- Two owners of a plant discussing plastics as materials and their basic properties, their ways of production, their environmental effects;

- a Russian and an English student of the department of chemistry speaking about properties and peculiarities of different plastics and polymers, ways of producing environmentally friendly plastics;

- two businessmen who want to start their own plant producing plastic goods which will be environmentally friendly;

- two proprietors trading plastic goods and discussing their peculiarities.

TEXT D

BIOPLASTICS

I. Read and translate the text.

From cars to food wrap and from planes to pens, you can make anything and everything from plastics — unquestionably the world's most versatile materials. But there's a snag. Plastics are synthetic (artificially created) chemicals that don't belong in our world and don't mix well with nature. Discarded plastics are a big cause of pollution, cluttering rivers, seas, and beaches, killing fish, choking birds, and making our environment a much less attractive place. Public pressure to clean up has produced plastics that seem to be more environmentally friendly. But are they all they're cracked up to be?

Plastics are carbon-based polymers (long-chain molecules that repeat their structures over and over) and we make them mostly from petroleum. They're incredibly versatile — by definition: the word plastic, which means flexible, says it all. The trouble is that plastic is just too good. We use it for mostly disposable, low-value items such as food-wrap and product packaging, but there's nothing particularly disposable about most plastics. On average, we use plastic bags for 12 minutes before getting rid of them, yet they can take fully 500 years to break down in the environment (quite how anyone knows this is a mystery, since plastics have been around only about a century).

Getting rid of plastics is extremely difficult. Burning them can give off toxic chemicals such as dioxins, while collecting and recycling them responsibly is also difficult, because there are many different kinds and each has to be recycled by a different process. If we used only tiny amounts of plastics that wouldn't be so bad, but we use them in astounding quantities. In Britain alone (one small island in a very big world), people use 8 billion disposable plastic bags each year. If you've ever taken part in a beach clean, you'll know that about 80 percent of the waste that washes up on the shore is plastic, including bottles, bottle tops, and tiny odd fragments known as "mermaids' tears."

We're literally drowning in plastic we cannot get rid of. And we're making most of it from oil — a non-renewable resource that's becoming increasingly expensive. It's been estimated that 200,000 barrels of oil are used each day to make plastic packaging for the United States alone.

Ironically, plastics are engineered to last. You may have noticed that some plastics do, gradually, start to go cloudy or yellow after long exposure to daylight (more specifically, in the ultraviolet light that sunlight contains). To stop this happening, plastics manufacturers generally introduce extra stabilizing chemicals to give their products longer life. With society's ever-increasing focus on protecting the environment, there's a new emphasis on designing plastics that will disappear much more quickly.

Источник: http://www.explainthatstuff.com/bioplastics.html

II. Write out all the words denoting chemical elements and terms from the text, find their transcriptions and Russian equivalents.

III. Translate the following word combinations from English into Russian.

Versatile material, snag, discarded plastics, to clutter rivers, to chock birds, to mix well with nature, public pressure, low-value items, disposable, to give off toxic chemicals, dioxins, to use in

astounding quantities, a non-renewable resource, ultraviolet light, extra stabilizing chemicals, ever-increasing focus.

IV. Translate the following word combinations from Russian into English.

Загвоздка, давление общественного мнения, выброшенный пластик, невозобновляемые ресурсы, ультрафиолет, универсальный материал, все более острый вопрос, выделять токсичные химикаты, дешевые товары, загрязнять реки, ошеломляющие количества, диоксин, запутываться в птичьем оперенье, благотворно влиять на природу, одноразовый.

V. Explain the following terms using your own words.

Versatile material, snag, discarded plastics, to clutter rivers, to chock birds, to mix well with nature, public pressure, low-value items, disposable, to give off toxic chemicals, to use in astounding quantities, a non-renewable resource, extra stabilizing chemicals, ever-increasing focus.

VI. Translate the following sentences from English into Russian.

1. **Ultraviolet** (**UV**) is an electromagnetic radiation with a wavelength, shorter than that of visible light but longer than X-rays. UV radiation constitutes about 10% of the total light output of the Sun, and is thus present in sunlight. It is also produced by electric arcs and specialized lights, such as mercury-vapor lamps, tanning lamps, and black lights.

Источник: https://www.boundless.com/physics/textbooks/boundless-physics-textbook/electromagnetic-waves-23/the-electromagnetic-spectrum-165/ultraviolet-light-596-11177

2. A **non-renewable resource** (also called a finite resource) is a resource that does not renew itself at a sufficient rate for sustainable economic extraction in meaningful human timeframes. An example is carbon-based, organically-derived fuel. The original organic material, with the aid of heat and pressure, becomes a fuel such as oil or gas. Earth minerals and metal

ores, fossil fuels (coal, petroleum, natural gas) and groundwater in certain aquifers are all considered non-renewable resources, though individual elements are almost always conserved.

Источник: https://en.wikipedia.org/wiki/Non-renewable_resource

3. In contrast, resources such as timber (when harvested sustainably) and wind (used to power energy conversion systems) are considered renewable resources, largely because their localized replenishment can occur within time frames meaningful to humans.

Источник: https://en.wikipedia.org/wiki/Non-renewable_resource

4. **Dioxins** and **dioxin-like compounds** (DLCs) are compounds that are highly toxic environmental persistent organic pollutants (POPs). They are mostly by-products of various industrial processes — or, in case of dioxin-like PCBs and PBBs, part of intentionally produced mixtures.

Источник: https://en.wikipedia.org/wiki/Dioxins_and_dioxin-like_compounds

5. In chemistry a stabilizer is a chemical which tends to inhibit the reaction between two or more other chemicals. It can be thought of as the antonym to a catalyst. The term can also refer to a chemical that inhibits separation of suspensions, emulsions, and foams. Heat and light stabilizers are added to plastics and elastomers because they ensure safe processing and protect products against premature aging and weathering. The trend is towards fluid systems, pellets, and increased use of masterbatches. There are monofunctional, bifunctional, and polyfunctional stabilizers. In economic terms the most important product groups on the market for stabilizers are compounds based on calcium (calcium-zinc and organo-calcium), lead, and tin stabilizers as well as liquid and light stabilizers (HALS, benzophenone, benzotriazole). Cadmium-based stabilizers largely vanished in the last years due to health and environmental concerns.

Источник: https://en.wikipedia.org/wiki/Stabilizer_(chemistry)

6. Injection molding has been one of the most popular ways for fabricating plastic parts for a very long time. They are used in automotive interior parts, electronic housings, housewares, medical equipment, compact discs, and even doghouses. Below are certain rule based standard guidelines which can be referred to while designing parts for injection molding considering manufacturability in mind.

Источник: https://en.wikipedia.org/wiki/Design_of_plastic_components

7. Plastic bags are one of the greatest problems of the consumer society — or to be more precise, of the throwaway society. First introduced in the United States in 1957, and into the rest of the world by the late 1960s, they have been found so convenient that they have come to be used in massive numbers.

Источник: http://megaobuchalka.ru/1/15070.html

8. The best way to use Earth's resources more sensibly is to reduce the amount of things that we use (for example, less packaging on food in shops) and to reuse things instead of throwing them away (reusing carrier bags at the grocery store makes a lot of sense). If we can't reduce or reuse, and we have to throw things away, recycling them is far better than simply tossing them out in the trash.

Источник: http://www.explainthatstuff.com/recycling.html

9. When you throw stuff away, you might be very glad to get rid of it: into the trash it goes, never to be seen again! Unfortunately, that's not the end of the story. The things we throw away have to go somewhere — usually they go off to be bulldozed underground in a landfill or burnt in an incinerator. Landfills can be horribly polluting. They look awful, they stink, they take up space that could be used for better things, and they sometimes create toxic soil and water pollution that can kill fish in our rivers and seas.

Источник: http://www.explainthatstuff.com/recycling.html

10. One of the worst things about landfills is that they're wasting a huge amount of potentially useful material. It takes a lot of energy and a lot of resources to make things and when we throw those things in a landfill, at the end of their lives, we're also saying goodbye to all the energy and resources they contain. Some authorities like to burn their trash in giant incinerators instead of burying it in landfills. That certainly has advantages: it reduces the amount of waste that has to be buried and it can generate useful energy. But it can also produce toxic air pollution and burning almost anything (except plants that have grown very recently) adds to the problem of global warming and climate change.

Источник: http://www.explainthatstuff.com/recycling.html

VII. Fill in the gaps.

1. Strong and … is ideal for products requiring both surface protection and cushioning.

2. … are cheap, mass-produced things that are used once or twice and then recycled.

3. … are special substances that serve as additives to plastics production. They give plastic things particular physical properties.

4. When burnt, plastics … intoxicating the air.

5. … is a difficult and expensive process, as it demands much energy and complicated technologies.

VIII. Translate from Russian into English.

1. Пластик является дешевым, универсальным материалом, массовое производство которого измеряется миллиардами тонн по всему миру.

2. Утилизация пластика представляет собой сложный и чрезвычайно дорогой производственный процесс, поскольку для каждого отдельного вида пластика существует свой собственный процесс, применимый лишь только к этому материалу.

3. Для того чтобы придать пластику определенные физические свойства, например цвет, прозрачность или, наоборот, дымчатость, применяются присадочные материалы, которые

называются стабилизаторами. При помощи стабилизаторов пластику придается чрезвычайная прочность, легкость, а также устойчивость к ультрафиолетовому излучению.

4. Под давлением общественного мнения производство пластика сокращается, а для упаковки применяется бумага и картон, поскольку они разлагаются в земле во много раз быстрее и не оказывают неблагоприятного влияния на окружающую среду.

5. Пластик производится из продуктов нефтепереработки. В свою очередь нефть является невозобновляемым ресурсом, поэтому сокращение производства пластика становится все более важным вопросом сохранения окружающей среды.

IX. Make up 10 sentences about plastics and their chemical and physical properties and ecological problems which they cause in English for your fellow-students to translate.

X. Act out a monologue of a professor of chemistry in Russian for your fellow-students to translate into English. Speak about plastics, their physical and chemical properties and their environmental influence.

XI. Make up Russian-English dialogues for your groupmates to translate:

- Two owners of a plant discussing plastics as materials, their basic properties, the problems of environment;
- a Russian and an English student of the department of chemistry speaking about properties and peculiarities of different plastics and polymers, their ecological influence and the ways of its reducing;
- two businessmen who want to start their own plant producing plastic goods, discussing the ways of production, environmental problems;
- two proprietors trading plastic goods and discussing their peculiarities, the problems of public opinion;
- two ecologists discussing the problems of environmental effects of plastic, the ways of reducing them.

TEXT E

TYPES OF BIOPLASTICS

Broadly speaking, so-called "environmentally friendly" plastics fall into three types:

- Bioplastics made from natural materials such as corn starch
- Biodegradable plastics made from traditional petrochemicals, which are engineered to break down more quickly
- Eco/recycled plastics, which are simply plastics made from recycled plastic materials rather than raw petrochemicals.

We'll look at each of these in turn.

The theory behind bioplastics is simple: if we could make plastics from kinder chemicals to start with, they'd break down more quickly and easily when we got rid of them. The most familiar bioplastics are made from natural materials such as corn starch and sold under such names as EverCorn™and NatureWorks — with a distinct emphasis on environmental credentials. Some bioplastics look virtually indistinguishable from traditional petrochemical plastics. Polylactide acid (PLA) looks and behaves like polyethylene and polypropylene and is now widely used for food containers. According to NatureWorks, making PLA saves two thirds the energy you need to make traditional plastics. Unlike traditional plastics and biodegradable plastics, bioplastics generally do not produce a net increase in carbon dioxide gas when they break down (because the plants that were used to make them absorbed the same amount of carbon dioxide to begin with). PLA, for example, produces almost 70 percent less greenhouse gases when it degrades in landfills.

Another good thing about bioplastics is that they're compostable: they decay into natural materials that blend harmlessly with soil. Some bioplastics can break down in a matter of weeks. The cornstarch molecules they contain slowly

absorb water and swell up, causing them to break apart into small fragments that bacteria can digest more readily.

If you're in the habit of reading what supermarkets print on their plastic bags, you may have noticed a lot of environmentally friendly statements appearing over the last few years. Some stores now use what are described as photodegradable, oxydegradable, or just biodegradable bags (in practice, whatever they're called, it often means the same thing). As the name suggests, these biodegradable plastics contain additives that cause them to decay more rapidly in the presence of light and oxygen (moisture and heat help too). Unlike bioplastics, biodegradable plastics are made of normal (petrochemical) plastics and don't always break down into harmless substances: sometimes they leave behind a toxic residue and that makes them generally (but not always) unsuitable for composting.

One neat solution to the problem of plastic disposal is to recycle old plastic materials (like used milk bottles) into new ones (such as items of clothing). A product called ecoplastic is sold as a replacement for wood for use in outdoor garden furniture and fence posts. Made from high-molecular polyethylene, the manufacturers boast that it's long-lasting, attractive, relatively cheap, and nice to look at.

But there are two problems with recycled plastics. First, plastic that's recycled is generally not used to make the same items the next time around: old recycled plastic bottles don't go to make new plastic bottles, but lower-grade items such as plastic benches and fence posts. Second, you can't automatically assume recycled plastics are better for the environment unless you know they've been made with a net saving of energy and water, a net reduction in greenhouse gas emissions, or some other overall benefit to the environment. Keeping waste out of a landfill and turning it into new things is great, but what if it takes a huge amount of energy to collect and recycle the plastic — more even than making brand new plastic products?

Anything that helps humankind solve the plastics problem has to be a good thing, right? Unfortunately, environmental

issues are never quite so simple. Actions that seem to help the planet in obvious ways sometimes have major drawbacks and can do damage in other ways. It's important to see things in the round to understand whether "environmentally friendly" things are really doing more harm than good.

Bioplastics and biodegradable plastics have long been controversial. Manufacturers like to portray them as a magic-bullet solution to the problem of plastics that won't go away. Bioplastics, for example, are touted as saving 30—80 percent of the greenhouse gas emissions you'd get from normal plastics and they can give food longer shelf-life in stores. But here are some of the drawbacks:

- When some biodegradable plastics decompose in landfills, they produce methane gas. This is a very powerful greenhouse gas that adds to the problem of global warming.
- Biodegradable plastics and bioplastics don't always readily decompose. Some need relatively high temperatures and, in some conditions, can still take many years to break down. Even then, they may leave behind toxic residues.
- Bioplastics are made from plants such as corn and maize, so land that could be used to grow food for the world is being used to "grow plastic" instead. By 2014, almost a quarter of US grain production was expected to have been turned over to biofuels and bioplastics production; taking more agricultural land out of production could cause a significant rise in food prices that would hit poorest people hardest.
- Some bioplastics, such as PLA, are made from genetically modified corn. Some environmentalists consider GM (genetically modified) crops to be inherently harmful to the environment, though others disagree.
- Bioplastics and biodegradable plastics cannot be easily recycled. To most people, PLA looks very similar to PET (polyethylene terephthalate) but, if the two are mixed up in a recycling bin, the whole collection becomes impossible to recycle. There are fears that increasing use of PLA may undermine existing efforts to recycle plastics.

• Many people think terms like "bioplastic," "biodegradable," and "compostable" mean exactly the same thing. But there's a huge difference between a "biodegradable" plastic (one that might take decades or centuries to break down) and a truly "compostable" material (something that turns almost entirely into benign waste after a matter of months in a composter), while "bioplastic," as we've already seen, can also mean different things. Confusing jargon hampers public understanding, which makes it harder for consumers to grasp the issues and make positive choices when they shop.

Why is life never simple? If you're keen on helping the planet, complications like this sound completely exasperating. But don't let that put you off. As many environmental campaigners point out, there are some very simple solutions to the plastics problem that everyone can bear in mind to make a real difference. Instead of simply sending your plastics waste for recycling, remember the saying "Reduce, repair, reuse, recycle". Recycling, though valuable, is only slightly better than throwing something away: you still have to use energy and water to recycle things and you probably create toxic waste products as well. It's far better to reduce our need for plastics in the first place than to have to dispose of them afterwards.

You can make a positive difference by actively cutting down on the plastics you use. For example:

• Get a reusable cotton bag and take that with you ever time you go shopping.

• Buy your fruit and vegetables loose, avoiding the extra plastic on pre-packaged items.

• Use long-lasting items (such as razors and refillable pens) rather than disposable ones. It can work out far cheaper in the long run.

• If you break something, can you repair it simply and carry on using it? Do you really have to buy a new one?

• Can you give unwanted plastic items a new lease of life? Ice cream tubs make great storage containers; vending machine cups can be turned into plant pots; and you can use old plastic supermarket bags for holding your litter.

• When you do have to buy new things, why not buy ones made from recycled materials? By helping to create a market for recycled products, you encourage more manufacturers to recycle.

One day, we may have perfect plastics that break down in a trice. Until then, let's be smarter about how we use plastics and how we get rid of them when we've finished with them.

Источник: http://www.explainthatstuff.com/bioplastics.html

I. Write out all the words denoting chemical elements and terms from the text, find their transcriptions and Russian equivalents.

II. Read, translate and transcribe the following words.

Bioplastics, biodegradable plastics, corn starch, raw petrochemicals, recycled plastic materials, kinder chemicals, break down, environmental credentials, to look virtually indistinguishable from smth, Polylactide acid, to absorb, greenhouse gases, to degrade in landfill, composable, to decay into natural materials, to blend harmlessly with soil, swell up, digest, to break apart into small fragments, photodegradable, oxydegradable, toxic residue, suitable\unsuitable for composing, a neat solution to the problem of plastic disposal, a replacement for, high molecular polyethylene, greenhouse gas emissions, environmental issues, a magic-bullet solution, to decompose in landfills, biofuels, environmentalists, genetically modified crops, to take decades or centuries to break down, benign waste, environmental campaigners, "Reduce, repair, reuse, recycle", long-lasting items, disposable items, pre-packaged items, unwanted plastic items, to give smth a new lease of life, vending machine cups.

III. Translate the following word combinations from English into Russian.

Стаканчики из торгового автомата, биопластик, кукурузный крахмал, выделение парниковых газов, замена для, биоразлагаемый пластик, ненужные предметы из пластика,

кислородоразлагаемый, фоторазлагаемый, элегантный выход из положения, безопасно разлагаться в почве, для разложения требуются десятки или даже сотни лет, многоразовые вещи, дать чему-то новую жизнь, упакованные товары, специалисты по экологии, активисты по защите окружающей среды, распадаться на натуральные компоненты, высокомолекулярный полиэтилен, разлагаться в почве, генномодифицированные растительные продукты, разбухать, переваривать, выглядеть практически так же, менее агрессивные химикаты, способный разлагаться, сырые продукты нефтепереработки, ядовитые отходы, панацея, токсичные отходы, полиэтилентерефталат, распадаться на мелкие части, способный/неспособный к разложению, экологические полномочия, полимолочная кислота.

IV. Explain the following terms using your own words.

Bioplastics, biodegradable plastics, raw petrochemicals, recycled plastic materials, kinder chemicals, break down, environmental credentials, to look virtually indistinguishable from smth, to absorb, greenhouse gases, to degrade in landfill, composable, to decay into natural materials, to blend harmlessly with soil, swell up, digest, to break apart into small fragments, photodegradable, oxydegradable, toxic residue, suitable\unsuitable for composing, a neat solution to the problem of plastic disposal, a replacement for, greenhouse gas emissions, environmental issues, a magic-bullet solution, to decompose in landfills, biofuels, environmentalists, genetically modified crops, to take decades or centuries to break down, benign waste, environmental campaigners, "Reduce, repair, reuse, recycle", long-lasting items, disposable items, pre-packaged items, unwanted plastic items, to give smth a new lease of life, vending machine cups.

Источник: https://en.wikipedia.org/wiki/Biodegradable_plastic

V. Translate from English into Russian.

1. Today the environmental problems have become so urgent that in the society of mass-production it has become

popular and even fashionable to be ecologically conscious. People try to avoid buying pre-packaged items in shops not to throw away much plastic, they try to use unwanted plastic items in household to give them a new lease of life.

2. The motto of environmental campaigners "Reduce, repair, reuse, recycle" has become very popular, as the majority of environmentally conscious people understand that unwanted thrown-away plastic creates benign waste in the nature.

3. There are several kinds of environmentally friendly plastics, such as bioplastics, biodegradable plastics, that decay in the soil into natural materials.

4. Photodegradable plastics decay under sunlight.

5. Oxydegradable material decompose under the effect of oxygen in the air.

6. Nowadays there is a constant search for a magic-bullet solution to the problem of ecological unfriendliness of plastics.

7. It takes decades or even centuries for plastics to break down in soil, more than that, in the process of breaking down they emit greenhouse gases and produce benign waste.

8. Biodegradable plastic is produced from starch. Biodegradable plastic goods look virtually indistinguishable from the items that are produced from habitual plastic.

9. Biodegradable plastic falls apart into small fragments and later bacteria quickly digest them in soil, so the process degrading is almost environmentally friendly.

10. Recycling of plastic materials is a high-technological process which takes much energy, money and time.

VI. Fill in the gaps.

1. … are plastics that are decomposed by the action of living organisms, usually bacteria.

2. Two basic classes of … plastics exist: …, whose components are derived from renewable raw materials, and plastics made from petrochemicals containing biodegradable additives which enhance biodegradation.

3. … is the process of recovering scrap or waste plastic and reprocessing the material into useful products. Since plastic is

non-biodegradable, recycling is a part of global efforts to reduce plastic in the waste stream, especially the approximately eight million metric tonnes of waste plastic that enter the Earth's ocean every year. This helps to reduce the high rates of plastic pollution.

4. … is a gas in an atmosphere that absorbs and emits radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect.

5. … also known as **genetically engineered foods**, are foods produced from organisms that have had changes introduced into their DNA using the methods of genetic engineering. Genetic engineering techniques allow for the introduction of new traits as well as greater control over traits than previous methods such as selective breeding and mutation breeding.

6. Established by senior chemists and marketing experts in 2004, … Co. LTD.(KinderChem) is specialized manufacturer of fine chemicals which are widely applied in pharmaceuticals, argochemicals, electronic chemicals, nutrition, cosmetics and surfactants.

7. A **…** is a fuel that is produced through contemporary biological processes, such as agriculture and anaerobic digestion, rather than a fuel produced by geological processes such as those involved in the formation of fossil fuels, such as coal and petroleum, from prehistoric biological matter.

8. … can be derived directly from plants, or indirectly from agricultural, commercial, domestic, and/or industrial wastes.

9. … is the alteration of materials by light. Typically, the term refers to the combined action of sunlight and air.

10. … is usually oxidation and hydrolysis.

11. Often … is avoided, since it destroys paintings and other artifacts. It is however partly responsible for remineralization of biomass and is used intentionally in some disinfection technologies.

12. … does not apply to how materials may be aged or degraded via Infrared light or heat, but does include degradation in all of the ultraviolet light wavebands.

VII. Translate from Russian into English.

1. В современном мире возникают новые тенденции в моде, основанные на создании новых материалов на основе переработанных продуктов и отходов химической продукции. Становится все более модным использовать ненужный пластик в хозяйственных целях дома, мастерить из него забавные предметы интерьера, украшения и даже мебель.

2. В процессе разложения в почве пластики выделяют токсичные отходы, вещества и, что особенно опасно, парниковые газы, отрицательно влияющие на озоновый слой атмосферы.

3. В последнее время возникают все новые компании по производству экологически безвредного пластика, который невозможно отличить от привычных нам материалов на вид, однако который состоит из кукурузного крахмала, распадающегося в почве на мелкие фрагменты, исчезающие без следа под воздействием микроорганизмов.

4. Создаются отдельные виды пластика, который разлагается под воздействием солнечного света, тепла или просто в процессе взаимодействия с кислородом.

5. Как показывает практика, в экологии не существует панацеи, способной раз и навсегда предложить простой и элегантный способ решения проблем разложения и переработки пластика. Каждый отдельный вид пластика требует особых процессов переработки, которые предполагают затраты не меньшие, чем производство нового пластика.

6. В современном мире предлагается производить экологически чистый пластик, который быстро разлагается в почве. Предполагается, что этот вид пластика будет хорошей заменой привычным видам пластмасс.

7. Становится все более модным следить за количеством применяемого в быту пластика. Люди стремятся сокращать покупки полиэтиленовых пакетов и упаковок, покупают товары на развес, а не в упаковках, даже одноразовые пластиковые стаканчики применяются повторно в качестве емкости для рассады или заморозки продуктов.

8. Производство экологичного пластика, по утверждению специалистов, повышает необходимость выращивания генномодифицированной кукурузы, так как биоразлагаемый пластик производят из крахмала. Генномодифицированные злаки, в свою очередь, также представляют определенную опасность для окружающей среды.

VIII. Make up 10 sentences about plastics and their chemical and physical properties and ecological problems. which they cause, in English for your fellow-students to translate.

IX. Act out a monologue of a professor of chemistry in Russian for your fellow-students to translate into English. Speak about plastics, their physical and chemical properties and their environmental influence.

• Make up Russian-English dialogues for your group-mates to translate:

- Two owners of a plant discussing plastics as materials, their basic properties, the problems of environment;

- a Russian and an English student of the department of chemistry speaking about properties and peculiarities of different plastics and polymers, their ecological influence and the ways of its reducing;

- two businessmen who want to start their own plant producing plastic goods, discussing the ways of production, environmental problems;

- two proprietors trading plastic goods and discussing their peculiarities, the problems of public opinion;

- two ecologists discussing the problems of environmental effects of plastic, the ways of reducing them.

TEXT F

PLASTICS AROUND US

Bakelite telephone

Once described as the "material of a thousand uses," bakelite, the first entirely synthetic plastic, was patented by Belgian-born chemist Dr Leo Baekeland in 1909. This tough, heat-resistant thermosetting plastic was widely used in light fittings and other forms of electrical insulation. Most early telephones were also made from bakelite.

Nylon stockings

The DuPont chemical company scored an immediate hit with its "stronger than steel" nylon stockings, which first went on sale on "N-Day," May 15, 1940. But when stockings reappeared in very limited quantities following World War II shortages, sudden demand led to so-called "nylon riots" in which stores were attacked by angry mobs. Read more in our main article on nylon.

Teflon cooking pans

Invented by Du Pont in 1938 and originally developed as a heat-resistant coating for space suits, polytetrafluoroethylene (PTFE), better known as Teflon, found fame as the non-stick coating in frying pans. Teflon is so slippery that it takes several sandblasting and baking processes and a special primer chemical just to make it stick to the pan!

Polyethylene extrusion

Polyethylene can be formed into pipes, tubes, sheets, or cling-film by a process called extrusion, in which the raw plastic is pumped through a shaping mold much like toothpaste is squeezed through a tube. This produces a hollow pipe or thin sheet of polyethylene that has a consistent cross-section all along its length. More complex shapes can be produced by extrusion blow molding. A length of tube is produced by extrusion, cut off, then blown like a balloon using compressed air to fill the inside of a mold.

Источник: http://www.explainthatstuff.com/plastics.html

I. Write out all the words denoting chemical elements and terms from the text, find their transcriptions and Russian equivalents.

II. Read, translate and transcribe the following words.

Entirely synthetic plastic, heat-resistant, thermosetting plastic, light fittings, electrical insulation, nylon riots, polytetrafluoroethylene, sandblasting processes, extrusion, to be pumped through smth, a consistent cross-section.

III. Translate the following word combinations from Russian into English.

Политетрафторэтилен, полностью синтезированный пластик, процесс пескоструйной обработки, последовательное поперечное сечение, электроизоляция, капроновые бунты, термосетный пластик, термостойкий, легкие запчасти, экструзия, накачивать через.

IV. Explain the following terms using your own words.

Entirely synthetic plastic, heat-resistant, thermosetting plastic, light fittings, electrical insulation, nylon riots, extrusion, to be pumped through smth, a consistent cross-section.

V. Translate the following sentences from English into Russian.

1. Celluloid, the first synthetic plastic material, developed in the 1860s and 1870s from a homogeneous colloidal dispersion of nitrocellulose and camphor. A tough, flexible, and moldable material that is resistant to water, oils, and dilute acids and capable of low-cost production in a variety of colours, celluloid was made into toiletry articles, novelties, photographic film, and many other mass-produced goods. Its popularity began to wane only toward the middle of the 20th century, following the introduction of plastics based on entirely synthetic polymers.

Источник: https://en.wikipedia.org/wiki/Celluloid

2. «Heat resistant» means «able to withstand heat». For example, heat-resistant glass is glass that is more resistant to thermal shock than ordinary glass. It is therefore suitable for industrial, construction, and cooking applications where changes in temperature would likely cause ordinary glass to shatter. Heat-resistant glass is usually borosilicate glass, tempered soda-lime glass, or glass-ceramic. Glass bakeware is often referred to by the general public as Pyrex, but this is properly a trademark of Corning, Inc., a major manufacturer of glass and ceramic products.

Источник: http://www.wisegeek.com/what-is-heat-resistant-glass.htm

3. A **thermosetting resin** is a prepolymer in a soft solid or viscous liquid state that changes irreversibly into an infusible, insoluble polymer network by curing. Curing is induced by the action of heat or suitable radiation often under high pressure, or by mixing with a catalyst or crosslinking agent often under atmospheric conditions at ambient temperature.

Источник: https://en.wikipedia.org/wiki/Thermosetting_polymer

4. A cured thermosetting resin is called a **thermoset** or a **thermosetting plastic/ polymer** — when used as the bulk material in a polymer composite, they are referred to as the thermoset polymer matrix.

Источник: https://en.wikipedia.org/wiki/Thermosetting_polymer

5. When compounded with fibres they form **fibre reinforced polymer composites** which are used in the fabrication of factory finished structural composite OEM or replacement parts,[and as site-applied, cured and finished composite repair and protection materials. When used as the binder for aggregates and other solid fillers they form **particulate reinforced polymer composites** which are used for factory-applied protective coating or component manufacture, and for site-applied and cured construction, maintenance, repair or overhaul of industrial engineering materials.]

Источник: https://en.wikipedia.org/wiki/Thermosetting_polymer

6. Curing transforms the resin into a plastic or elastomer/ rubber by crosslinking through the formation of strong covalent bonds between individual chains of the polymer. Crosslink density varies depending on the monomer/pre-polymer mix used, and how the crosslinking is facilitated:

Источник: https://en.wikipedia.org/wiki/Thermosetting_polymer

7. **Acrylic resins, polyesters** and **vinyl esters** with unsaturated sites at the ends or on the backbone are generally linked by copolymerisation with unsaturated monomer diluents, with cure initiated by free radicals generated from ionizing radiation or by the photolytic or thermal decomposition of a radical initiator — the intensity of crosslinking is influenced by the degree of backbone unsaturation in the prepolymer.

Источник: https://en.wikipedia.org/wiki/Thermosetting_polymer

8. Epoxy functional resins can be homopolymerised with anionic or cationic catalysts and heat, or copolymerised through nucleophilic addition reactions with multifunctional crosslinking agents which are also known as curing agents or hardeners. As reaction proceeds, larger and larger molecules are formed and highly branched crosslinked structures develop, the rate of cure being influenced by the physical form and functionality of epoxy resins and curing agents — elevated temperature postcuring induces secondary crosslinking of backbone hydroxyl functionality which condense to form ether bonds.

Источник: https://en.wikipedia.org/wiki/Thermosetting_polymer

9. Form when isocyanate resins and prepolymers are combined with low — or high-molecular weight polyols, with strict stochiometric ratios being essential to control nucleophilic addition polymerisation — the degree of crosslinking and resulting physical type (elastomer or plastic) is adjusted from the molecular weight and functionality of isocyanate resins, prepolymers, and the exact combinations of diols, triols and polyols selected.

Источник: https://en.wikipedia.org/wiki/Thermosetting_polymer

10. **Phenolic, amino** and **furan** resins all cure by polycondensation involving the release of water and heat, with cure initiation and polymerisation exotherm control influenced by curing temperature, catalyst selection/loading and processing method/pressure — the degree of pre-polymerisation and level of residual hydroxymethyl content in the resins determine the crosslink density

Источник: https://en.wikipedia.org/wiki/Thermosetting_polymer

11. Thermoset plastic polymers characterised by rigid, three-dimensional structures and high molecular weight, stay out of shape when deformed and undergo permanent or plastic deformation under load, and normally decompose before melting. Thermoset elastomers, which are soft and springy or rubbery and can be deformed and revert to their original shape on loading release, also decompose before melting.

Источник: https://en.wikipedia.org/wiki/Thermosetting_polymer

12. Conventional thermoset plastics or elastomers therefore cannot be melted and re-shaped after they are cured which implies that thermosets cannot be recycled for the same purpose, except as filler material. There are developments however involving thermoset epoxy resins which on controlled and contained heating form crosslinked networks that can be repeatedly reshaped like silica glass by reversible covalent bond exchange reactions on reheating above the glass transition temperature. There are also thermoset polyurethanes shown to have transient properties and which can thus be reprocessed or recycled.

Источник: https://en.wikipedia.org/wiki/Thermosetting_polymer

13. Thermosetting polymer mixtures based on thermosetting resin monomers and pre-polymers can be formulated and applied/processed in a variety of ways to create distinctive cured properties that cannot be achieved with thermoplastic polymers or inorganic materials.

Источник: https://en.wikipedia.org/wiki/Thermosetting_polymer

14. Application/process uses and methods for thermosets include adhesives, sealants, jointing and injection grouts, solid foams, construction, foundry sands, casting, encapsulation, protective coating, seamless flooring, wet lay-up laminating, pultrusion, gelcoats, filament winding, pre-pregs, and molding.

Источник: https://en.wikipedia.org/wiki/Thermosetting_polymer

VI. Fill in the gaps.

1. … were a series of disturbances at American stores created by a nylon stocking shortage.

2. **…** is a process used to create objects of a fixed cross-sectional profile. A material is pushed through a die of the desired cross-section. The two main advantages of this process over other manufacturing processes are its ability to create very complex cross-sections, and to work materials that are brittle, because the material only encounters compressive and shear stresses. It also forms parts with an excellent surface finish.

3. … is a material whose internal electric charges do not flow freely, and therefore make it nearly impossible to conduct an electric current under the influence of an electric field. This contrasts with other materials, semiconductors and conductors, which conduct electric current more easily. The property that distinguishes an insulator is its resistivity; insulators have higher resistivity than semiconductors or conductors.

4. In chemistry, **…** is a synthetic fluoropolymer of tetrafluoroethylene which finds numerous applications. PTFE is most well known by the DuPont brand name **Teflon**.

VII. Translate from Russian into English.

1. Изготовление термосетов представляет собой сложный технологический процесс, включающий в себя ряд процедур, требующий определенных условий, а также ряда химических составляющих, например пластификаторов.

2. Полностью синтетический пластик был впервые произведен в середине прошлого века и изготавливался из эпоксидной смолы.

3. Для изготовления антипригарных покрытий применяют технологию пескоструйной обработки.

4. Политетрафторэтилен, называемый в быту тефлоновым покрытием, применяют для изготовления кухонной утвари с теплостойкими свойствами.

VIII. Make up 10 sentences about plastics and their chemical and physical properties and ecological problems. which they cause, in English for your fellow-students to translate.

IX. Act out a monologue of a professor of chemistry in Russian for your fellow-students to translate into English. Speak about plastics, their physical and chemical properties and their ways of application.

• Make up Russian-English dialogues for your group-mates to translate:

- Two owners of a plant discussing creating of new types of plastics, their basic properties, the problems of environment;

- a Russian and an English student of the department of chemistry speaking about properties and peculiarities of different plastics and polymers, their ecological influence and the ways of its reducing;

- two businessmen who want to start their own plant producing plastic goods, discussing the ways of production of new plastics, environmental problems;

- two proprietors trading plastic goods and discussing their peculiarities, the problems of public opinion, the ways of reducing environmental harm;

- two ecologists discussing the problems of environmental effects of plastic, the ways of reducing them, the ways of creating new plastics which are environmentally friendly.

TEXT G

PLASTIC RECYCLING

Plastic recycling is the process of recovering scrap or waste plastic and reprocessing the material into useful products. Since plastic is non-biodegradable, recycling is a part of global efforts to reduce plastic in the waste stream, especially the approximately eight million metric tonnes of waste plastic that enter the Earth's ocean every year. This helps to reduce the high rates of plastic pollution.

Plastic recycling includes taking any type of plastic sorting it into different polymers and then chipping it and then melting it down into pellets after this stage it can then be used to make items of any kind such as plastic chairs and tables. Soft Plastics are also recycled such as polyethylene film and bags. This closed-loop operation has taken place since the 1970s and has made the production of some plastic products amongst the most efficient operations today.

Compared with lucrative recycling of metal, and similar to the low value of glass, plastic polymers recycling is often more challenging because of low density and low value. There are also numerous technical hurdles to overcome when recycling plastic.

A macro molecule interacts with its environment along its entire length, so total energy involved in mixing it is largely due to the product side stoichiometry (see enthalpy). Heating alone is not enough to dissolve such a large molecule, so plastics must often be of nearly identical composition to mix efficiently.

When different types of plastics are melted together, they tend to phase-separate, like oil and water, and set in these layers. The phase boundaries cause structural weakness in the resulting material, meaning that polymer blends are useful in only limited applications. The two most widely manufactured plastics, polypropylene and polyethylene behave this way, which limits their utility for recycling. Recently, a method that uses "molecular stitches" or "macromolecular welding flux" has been developed that could revolutionize how these plastics are recycled.

Another barrier to recycling is the widespread use of dyes, fillers, and other additives in plastics. The polymer is generally too viscous to economically remove fillers, and would be damaged by many of the processes that could cheaply remove the added dyes. Additives are less widely used in beverage containers and plastic bags, allowing them to be recycled more often. Yet another barrier to removing large quantities of plastic from the waste stream and landfills is the fact that many common but small plastic items lack the universal triangle recycling symbol and accompanying number. An example is the billions of plastic utensils commonly distributed at fast food restaurants or sold for use at picnics.

The percentage of plastic that can be fully recycled, rather than downcycled or go to waste can be increased when manufacturers of packaged goods minimize mixing of packaging materials and eliminate contaminants. The Association of Plastics Recyclers have issued a Design Guide for Recyclability.

The use of biodegradable plastics is increasing.

Before recycling, most plastics are sorted according to their resin type. In the past, plastic reclaimers used the resin identification code (RIC), a method of categorization of polymer types, which was developed by the Society of the Plastics Industry in 1988. polyethylene terephthalate, commonly referred to as PET, for instance, has a resin code of 1. Most plastic reclaimers do not rely on the RIC now; they use automatic sort systems to identify the resin. Ranging from manual sorting and picking of plastic materials; to mechanized automation processes that involve shredding, sieving, separation by rates of density i.e. air, liquid, or magnetic, and complex spectrophotometric distribution technologies e.g. UV/VIS, NIR, Laser, etc. Some plastic products are also separated by color before they are recycled. The plastic recyclables are then shredded. These shredded fragments then undergo processes to eliminate impurities like paper labels. This material is melted and often extruded into the form of pellets which are then used to manufacture other products.

Thermal depolymerization

Another process involves the conversion of assorted polymers into petroleum by a much less precise thermal depolymerization process. Such a process would be able to accept almost any polymer or mix of polymers, including thermoset materials such as vulcanized rubber tire separation of wastes and the biopolymers in feathers and other agricultural waste. Like natural petroleum, the chemicals produced can be made into fuels as well as polymers. A pilot plant of this type exists in Carthage, Missouri, United States, using turkey waste as input material. Gasification is a similar process, but is not technically recycling, since polymers are not likely to become the result.

Waste Plastic Pyrolysis to fuel oil

Plastic Pyrolysis can convert petroleum based waste streams such as plastics into quality fuels, carbons.

Given below is the list of suitable plastic raw materials for pyrolysis:

- Mixed plastic (HDPE, LDPE, PE, PP, Nylon, Teflon, PS, ABS, FRP etc.)
- Mixed waste plastic from waste paper mill
- Multi Layered Plastic

Heat compression

Yet another process that is gaining ground with startup companies (especially in Australia, United States and Japan) is heat compression. The heat compression process takes all unsorted, cleaned plastic in all forms, from soft plastic bags to hard industrial waste, and mixes the load in tumblers (large rotating drums resembling giant clothes dryers). The most obvious benefit to this method is the fact that all plastic is recyclable, not just matching forms. However, criticism rises from the energy costs of rotating the drums, and heating the post-melt pipes.

Distributed recycling

For some waste plastics, recent technical devices called recyclebots enable a form of distributed recycling. Preliminary life-cycle analysis(LCA) indicates that such distributed recycling of HDPE to make filament of 3-D printers in rural

regions is energetically favorable to either using virgin resin or conventional recycling processes because of reductions in transportation energy.

Other processes

A process has also been developed in which many kinds of plastic can be used as a carbon source in the recycling of scrap steel. There is also a possibility of mixed recycling of different plastics, which does not require their separation. It is called Compatibilization and requires use of special chemical bridging agents compatibilizers. It can help to keep the quality of recycled material and to skip often expensive and inefficient preliminary scanning of waste plastics streams and their separation/purification.

Источник: https://en.wikipedia.org/wiki/Plastic_recycling

I. Write out all the words denoting chemical elements and terms from the text, find their transcriptions and Russian equivalents.

Plastic recycling, to reprocess smth into smth, to reduce the high rates of plastic pollution, to melt smth into pellets, closed-loop operation, efficient operation, lucrative recycling of metals, technical hurdles, stoichiometry, to dissolve a molecule, to mix efficiently, to phase-separate, phase boundaries, to cause structural weakness, resulting material, polymer blends, limited applications, widely manufactured plastics, polypropylene, to limit the utility for recycling, molecular stitches, macromolecular welding flux, revolutionize, a barrier to recycling, a widespread use, fillers, dyes, additive, viscous, beverage containers, plastic utensils, to downcycle, to minimize mixing of packaging materials, eliminate contaminants, recyclability, biodegradable plastics, plastic reclaimers, resin identification code, a method of categorization of polymer type, polyethylene terephthalate, automatic sort system, manual sorting, mechanized automation process, shredding, sieving, separation by rate of density, complex spectrophotometric distribution technologies, undergo processes to eliminate

impurities like paper labels, thermal depolymerization, the conversion of assorted polymers into petroleum, vulcanized rubber tire, agricultural waste, input material, gasification, pyrolyses, waste paper mill, multi layered plastics, to gain ground, a startup company, heat compression, tumblers, post-melt pipes, distributed recycling, recyclebots, preliminary life-cycle analyses, energetically favourable, conventional recycling, reduction in transportation energy, scrap steel, mixed recycling, Compatibilization, use of special chemical bridging agents compatibilizers, to keep the quality of recycled material, to skip expensive and inefficient preliminary scanning of waste plastics streams, separation/purification.

II. Translate the following words from Russian into English.

Сортировка, очистка, сортировка по степени плотности, метод категоризации полимерного типа, поддерживать качество переработанного материала, ручная сортировка, полипропилен, вязкий, смеси полимеров, автоматическая сортировочная система, провоцировать слабость структурных связей, биоразлагаемый пластик, проходить через процессы отделения таких загрязнений, как, например, бумажные наклейки; термодеполимеризация, барабаны, смешанный тип переработки, избежать дорогостоящих и неэффективных процессов предварительного сканирования пластиковых отходов, измельчение, механизированная автопереработка, компатибидизация, предварительный анализ жизненного цикла пластика, технические сложности, переплавлять в гранулы, зацикленный процесс, перерабатывать что-то во что-то, переработка пластика, снижать степень загрязнения пластиком, эффективная операция, растворить молекулу, разделяться на фракции, сельскохозяйственный мусор, многослойный пластик, вулканизированная резина, набирать обороты, начинающая компания, пилотный проект, применение специальных химикатов, снижать вероятность смешивания упаковочных материалов, снижение энергорасходов на транспорт.

III. Explain what is meant by:

Plastic recycling, to reprocess smth into smth, to reduce the high rates of plastic pollution, to melt smth into pellets, closed-loop operation, efficient operation, lucrative recycling of metals, technical hurdles, to phase-separate, phase boundaries, resulting material, polymer blends, limited applications, widely manufactured plastics, polypropylene, to limit the utility for recycling, a barrier to recycling, a widespread use, fillers, dyes, additive, viscous, beverage containers, plastic utensils, to minimize mixing of packaging materials, eliminate contaminants, recyclability, biodegradable plastics, plastic reclaimers, resin identification code, a method of categorization of polymer type, manual sorting, mechanized automation process, shredding, sieving, separation by rate of density, undergo processes to eliminate impurities like paper labels, the conversion of assorted polymers into petroleum, agricultural waste, input material, gasification, waste paper mill, multi layered plastics, to gain ground, a startup company, heat compression, tumblers, post-melt pipes, distributed recycling, preliminary life-cycle analyses, energetically favourable, conventional recycling, reduction in transportation energy, scrap steel, mixed recycling, use of special chemical bridging agents compatibilizers, to keep the quality of recycled material, to skip expensive and inefficient preliminary scanning of waste plastics streams, separation/purification.

IV. Fill in the gaps.

1. To … it is necessary to sort different types of waste plastic not only in factories and plants, but also at home.

2. … are plastics that are not environmentally persistent and aggressive, as they dissolve under the bacteria-effect.

3. One of the problems of recycling plastics is thet during the process they … like water and oil.

4. … is a kind of contamination that demands a special removing technology.

5. … it is necessary to sort plastics according to their type and density.

6. … is a common technology of working with waste plastic.

7. To reach efficient recycling of plastics it is necessary to differentiate between their …

8. … is a process of cutting plastic waste into smaller parts.

9. After shredding plastic waste is … into …

10. Multi-mix recycling process demands melting plastic mixtures in …

V. Translate from Russian into English.

1. Для переработки пластика разработано большое количество сортировочных систем, начиная от простой ручной сортировки и заканчивая сложнейшими технологическими процессами механического определения плотности и жизненного цикла отработанного пластика.

2. Основная сложность в переработке пластика состоит в том, что практически невозможно переработать разные типы пластика в рамках одного процесса.

3. Если при переработке пластика смешивать различные по типу виды пластика, они при перемешивании будут расслаиваться на фракции, подобно маслу и воде, а в готовых изделиях будут образовываться области структурной слабости, значительно снижающей качество готовой продукции.

4. Переработка смеси разных типов пластика в рамках одного технологического процесса — очень дорогостоящая технология, поскольку такая смесь плавится и перемешивается в огромных барабанах, что требует значительных энерго-, а следовательно, и денежных затрат.

5. Любая переработка пластиковых отходов начинается с автоматического сканирования пластиковых отходов.

6. Метод категоризации полимерного типа позволяет разделить перерабатываемую массу отработанного пластика на части, состоящие из пластиков различного полимерного типа, требующих разной технологии переработки.

7. В идеале производство пластика должно представлять собой зацикленный процесс, исключающий производство нового пластика, а предполагающий производство новых изделий из переработанных старых.

8. Переработка пластика — единственное средство снизить уровень пластикового загрязнения окружающей среды.

9. Одно из важнейших препятствий в переработке пластика — это смеси полимеров, которые весьма трудно и энергозатратно отделять друг от друга.

10. В современном мире существует значительное число компаний по переработке пластика, скупающих пластиковые отходы и перерабатывающие их с применением современных сложных технологических процессов, механизмов и новых разработанных химических веществ.

VI. Make up 10 sentences about plastics and their chemical and physical properties, ways of recycling and ecological problems, which they cause, in English for your fellow-students to translate.

VII. Act out a monologue of a professor of chemistry in Russian for your fellow-students to translate into English. Speak about plastics, their physical and chemical properties and their ways of application and recycling.

• Make up Russian-English dialogues for your group-mates to translate:

- Two owners of a plant discussing creating of new types of plastics, their basic properties, the problems of environment and recycling;

- a Russian and an English student of the department of chemistry speaking about properties and peculiarities of different plastics and polymers, the ways of their recycling, their ecological influence and the ways of its reducing;

- two businessmen who want to start their own plant producing plastic goods, discussing the ways of production of new plastics and recycling them;

- two proprietors trading plastic goods and discussing their peculiarities, the problems of public opinion, the ways of reducing environmental harm by recycling plastics;

- two ecologists discussing the problems of environmental effects of plastic, the ways of reducing them, the ways of creating new plastics which are environmentally friendly, the ways of recycling plastics.

TEXT H

Applications

PET

Post-consumer polyethylene terephthalate (PET or PETE) containers are sorted into different colour fractions, and baled for onward sale. PET recyclers further sort the baled bottles and they are washed and flaked (or flaked and then washed). Non-PET fractions such as caps and labels are removed during this process. The clean flake is dried. Further treatment can take place e.g. melt filtering and pelletising or various treatments to produce food-contact-approved recycled PET (RPET).

RPET has been widely used to produce polyester fibres. This sorted post-consumer PET waste is crushed, chopped into flakes, pressed into bales, and offered for sale.

One use for this recycled PET that has recently started to become popular is to create fabrics to be used in the clothing industry. The fabrics are created by spinning the PET flakes into thread and yarn. This is done just as easily as creating polyester from brand new PET. The recycled PET thread or yarn can be used either alone or together with other fibers to create a very wide variety of fabrics. Traditionally these fabrics are used to create strong, durable, rough, products, such as jackets, coat, shoes, bags, hats, and accessories since they are usually too rough for direct skin contact and can cause irritation. However, these types of fabrics have become more popular as a result of the public's growing awareness of environmental issues. Numerous fabric and clothing manufacturers have capitalized on this trend.

Other major outlets for RPET are new containers (food-contact or non-food-contact) produced either by (injection stretch blow) moulding into bottles and jars or by thermoforming APET sheet to produce clam shells, blister packs and collation trays. These applications used 46% of all RPET produced in

Europe in 2010. Other applications, such as strapping tape, injection-moulded engineering components and even building materials account for 13% of the 2010 RPET production.

In the United States the recycling rate for PET packaging was 31.2% in 2013, according to a report from The National Association for PET Container Resources (NAPCOR) and The Association of Postconsumer Plastic Recyclers (APR). A total of 1,798 million pounds was collected and 475 million pounds of recycled PET used out of a total of 5,764 million pounds of PET bottles.

HDPE

Plastic # 2, high-density polyethylene (HDPE) is a commonly recycled plastic. It is typically downcycled into plastic lumber, tables, roadside curbs, benches, truck cargo liners, trash receptacles, stationery (e.g. rulers) and other durable plastic products and is usually in demand.

PS

The resin identification code symbol for polystyrene

Most polystyrene products are currently not recycled due to the lack of incentive to invest in the compactors and logistical systems required. As a result, manufacturers cannot obtain sufficient scrap. Expanded polystyrene (EPS) scrap can easily be added to products such as EPS insulation sheets and other EPS materials for construction applications. When it is not used to make more EPS, foam scrap can be turned into clothes hangers, park benches, flower pots, toys, rulers, stapler bodies, seedling containers, picture frames, and architectural molding from recycled PS.

Recycled EPS is also used in many metal casting operations. Rastra is made from EPS that is combined with cement to be used as an insulating amendment in the making of concrete foundations and walls. Since 1993, American manufacturers have produced insulating concrete forms made with approximately 80% recycled EPS.

Other plastics

The white plastic polystyrene foam peanuts used as packing material are often accepted by shipping stores for reuse.

Successful trials in Israel have shown that plastic films recovered from mixed municipal waste streams can be recycled into useful household products such as buckets.

Similarly, agricultural plastics such as mulch film, drip tape and silage bags are being diverted from the waste stream and successfully recycled into much larger products for industrial applications such as plastic composite railroad ties. Historically, these agricultural plastics have primarily been either landfilled or burned on-site in the fields of individual farms.

CNN reports that Dr. S. Madhu of the Kerala Highway Research Institute, India, has formulated a road surface that includes recycled plastic: aggregate, bitumen (asphalt) with plastic that has been shredded and melted at a temperature below 220 degrees C (428 °F) to avoid pollution. This road surface is claimed to be very durable and monsoon rain resistant. The plastic is sorted by hand, which is economical in India. The test road used 60 kg of plastic for an approximately 500m-long, 8m-wide, two-lane road. The process chops thin-film road-waste into a light fluff of tiny flakes that hot-mix plants can uniformly introduce into viscous bitumen with a customized dosing machine. Tests at both Bangalore and the Indian Road Research Centre indicate that roads built using this 'KK process' will have longer useful lives and better resistance to cold, heat, cracking, and rutting, by a factor of three.

Recycling rates

The quantity of post-consumer plastics recycled has increased every year since at least 1990, but rates lag far behind those of other items, such as newspaper (about 80%) and corrugated fiberboard (about 70%). Overall, U.S. post-consumer plastic waste for 2008 was estimated at 33.6 million tons; 2.2 million tons (6.5%) were recycled and 2.6 million tons (7.7%) were burned for energy; 28.9 million tons, or 85.5%, were discarded in landfills.

Economic and energy potential

In 2008, the price of PET dropped from $370/ton in the US to $20 in November. PET prices had returned to their long-term averages by May 2009.

Recycling one ton of plastic can save 5,774 kWh of energy, 98,000,000 btus of energy, 1,000-2,000 gallons of gasoline, 685 gallons of oil, 30 cubic yards of landfill space, 48,000 gallons of water.

Consumer education

United Kingdom

In the UK, the amount of post-consumer plastic being recycled is relatively low, due in part to a lack of recycling facilities.

The Plastics 2020 Challenge was founded in 2009 by the plastics industry with the aim of engaging the British public in a nationwide debate about the use, reuse and disposal of plastics, and hosts a series of online debates on its website framed around the waste hierarchy.

There is a facility in Worksop capable of recycling 60–80 thousand metric tonnes a year.

In Northern Ireland, the rate of recycling is relatively low at only 37.4%. However, emerging technologies are helping to increase the recycling rates of items previously landfilled e.g. mixed hard plastics.

Plastic identification code

Five groups of plastic polymers, each with specific properties, are used worldwide for packaging applications (see table below). Each group of plastic polymer can be identified by its Plastic Identification code (PIC), usually a number or a letter abbreviation. For instance, Low-Density Polyethylene can be identified by the number "4" or the letters "LDPE". The PIC appears inside a three-chasing-arrow recycling symbol. The symbol is used to indicate whether the plastic can be recycled into new products.

The PIC was introduced by the Society of the Plastics Industry, Inc., to provide a uniform system for the identification of various polymer types and to help recycling companies separate various plastics for reprocessing. Manufacturers of plastic products are required to use PIC labels in some countries/regions and can voluntarily mark their products with the PIC where there are no requirements. Consumers can identify the plastic types based on the codes usually found at

the base or at the side of the plastic products, including food/chemical packaging and containers. The PIC is usually not present on packaging films, since it is not practical to collect and recycle most of this type of waste.

United States

Low national plastic recycling rates have been due to the complexity of sorting and processing, unfavorable economics, and consumer confusion about which plastics can actually be recycled. Part of the confusion has been due to the use of the resin identification code which is not on all plastic parts but just a subset that includes the recycling symbol as part of its design. The resin identification code is stamped or printed on the bottom of containers and surrounded by a triangle of arrows. (See the table in Plastic.) The intent of these symbols was to make it easier to identify the type of plastics used to make a particular container and to indicate that the plastic is potentially recyclable. The question that remains is which types of plastics can be recycled by your local recycling center. In many communities, not all types of plastics are accepted for sidewalk recycling collection programs due to the high processing costs and complexity of the equipment required to recycle certain materials. There is also sometimes a seemingly low demand for the recycled product depending on a recycling center's proximity to entities seeking recycled materials. Another major barrier is that the cost to recycle certain materials and the corresponding market price for those materials sometimes does not present any opportunity for profit. The best example of this is polystyrene (commonly called styrofoam), although some communities, like Brookline, MA, are moving toward banning the distribution of polystyrene containers by local food and coffee businesses.

Источник: https://en.wikipedia.org/wiki/Plastic_recycling

I. Translate the following words and expressions from English into Russian.

Post-consumer polyethylene terephthalate, to be sorted into different colour fractions, to be baled for onward sale,

PET recyclers, baled bottles, to be flaked, non-PET fractions, to be removed during the process, filtering, pelletising, food-contact-approved recycled PET (RPET), polyester fibres, post-consumer PET waste, to be chopped into flakes, to be pressed into bales, to create fabrics to be used in the clothing industry, to spin the PET flakes into thread and yarn, the recycled PET thread or yarn, to create a very wide variety of fabrics, strong, durable, rough, products, to be too rough for direct skin contact, to cause irritation, the public's growing awareness of environmental issues, to capitalize on a trend, outlets for RPET, food-contact or non-food-contact containers, injection stretch blow, thermoforming APET sheet, to produce clam shells, blister packs, collation trays, strapping tape, injection-molded engineering components, the recycling rate for PET packaging, high-density polyethylene, a commonly recycled plastic, to be downcycled into plastic lumber, truck cargo liners, trash receptacles, stationery, durable plastic products, to be in demand, the resin identification code, the lack of incentive to invest in the compactors and logistical systems required, to obtain sufficient scrap, expanded polystyrene (EPS) scrap, construction applications, metal casting operations, an insulating amendment, concrete foundations, agricultural plastics, mulch film, drip tape, silage bags, industrial applications, plastic composite railroad ties, a road surface that includes recycled plastic, aggregate, bitumen (asphalt), to be shredded and melted at a temperature below 220 degrees C, rain resistant, a light fluff of tiny flakes, hot-mix plants, to introduce into viscous bitumen, a customized dosing machine, resistance to cold, heat, cracking, and rutting, post-consumer plastics, corrugated fiberboard, three-chasing-arrow recycling symbol, a uniform system for the identification of various polymer types, the complexity of sorting and processing, unfavorable economics, and consumer confusion, sidewalk recycling collection programs, high processing costs, complexity of the equipment, opportunity for profit, to ban the distribution of polystyrene containers.

II. Translate the following words and word combinations from Russian into English.

Возможность получить выгоду, устойчивый к погодным условиям, переработанный пластик, применение в промышленных целях, символ из трех стрелок, универсальная система определения типа пластмассы, устойчивость к холоду, жаре, трещинам, изломам, быть измельченным и расплавленным при температуре 220 градусов по Цельсию, сельскохозяйственный пластик, легкий порошок из мельчайших хлопьев, неразвитая экономика, низкий уровень сознательности населения, сложность процессов сортировки и переработки, запрет распространения полистероловых контейнеров, программа сбора пластика на улицах, пищевые и непищевые контейнеры, прясть из переработанного пластика волокна и нити, удаляться в процессе переработки, создавать широкий ассортимент тканей, быть слишком грубым для прямого контакта с кожей, вызывать раздражение, переработанный пластик, одобренный для пищевых целей, сознательносе отношение общественности к проблемам окружающей среды, идентификационный код смолы, блистеры, упаковочный материал, применение в строительстве, полиэстеровые пленки.

III. Try to explain the following words and expressions using your own words.

To be sorted into different colour fractions, to be baled for onward sale, baled bottles, to be flaked, non-PET fractions, to be removed during the process, filtering, pelletising, food-contact-approved recycled PET (RPET), polyester fibres, post-consumer PET waste, to be chopped into flakes, to be pressed into bales, to create fabrics to be used in the clothing industry, to spin the PET flakes into thread and yarn, the recycled PET thread or yarn, to create a very wide variety of fabrics, public's growing awareness of environmental issues, to capitalize on a trend, food-contact or non-food-contact containers, a commonly recycled plastic, to be downcycled into plastic lumber, durable

plastic products, to be in demand, the resin identification code, the lack of incentive to invest in the compactors and logistical systems required, to obtain sufficient scrap, rain resistant, a light fluff of tiny flakes, hot-mix plants, resistance to cold, heat, cracking, and rutting, post-consumer plastics, a uniform system for the identification of various polymer types, the complexity of sorting and processing, unfavorable economics, consumer confusion, sidewalk recycling collection programs, high processing costs, complexity of the equipment, opportunity for profit, to ban the distribution of polystyrene containers.

IV. Translate the following sentences from English into Russian.

1. Nowadays the growing awareness of the public of the environmental issues makes them take tart in such programs as sidewalk recycling collection program, sort plastic trash manually at home and bring it to local plastic recycling centers.

2. The process of automatic sorting of unwanted plastic includes distributing it into different colour fractions, distributing between PET — and non- PET fractions.

3. Post-consumer polyethylene terephthalate is widely used for production food-contact-approved containers, baled bottles, fibres, which are spun into threads and yarns.

4. Contaminants are removed during the process of sorting, later plastics are chopped into flakes, or pressed into bales.

5. Recycled plastics are used to create a very wide variety of fabrics, which are strong, durable, but are rough for direct skin contact and can cause irritation.

6. There are many startup companies that try to capitalize on the latest trend, based on production various fabrics from recycled plastic. This trend is supported by the growing awareness of the public of the environmental issues.

7. After the sorting of sorting and melting companies release food-contact or non-food-contact containers, thermoforming APET sheets, clam shells, blister packs, collation trays, strapping tape, injection-molded engineering components and many other products which are in demand.

8. The resin identification code helps to differentiate between the type of plastic to make the process of recycling faster and easier.

9. The basic difficulty of developing of recycling plants is in the lack of incentive to invest in the compactors and logistical systems required.

10. Post-consumer plastics are widely used in industrial applications, such as plastic composite railroad ties, road surfaces including recycled plastic, aggregate, bitumen (asphalt), etc.

V. Fill in the gaps.

1. In the UK, the amount of … being recycled is relatively low, due in part to a lack of recycling facilities.

2. The main problem with recycling plastic involves … because there are so many different types of plastic which complicate the process.

3. For this reason plastic often has to be sorted … which can be very time consuming.

4. … was founded in 2009 by the plastics industry with the aim of engaging the British public in a nationwide debate about the use, reuse and disposal of plastics, and hosts a series of online debates on its website framed around the waste hierarchy.

5. … is a rectangular support for the rails in railroad tracks. Generally laid perpendicular to the rails, ties transfer loads to the track ballast and subgrade, hold the rails upright and keep them spaced to the correct gauge.

6. … is a set of symbols appearing on plastic products that identify the plastic resin out of which the product is made. It was developed originally by the Society of the Plastics Industry (now the Plastics Industry Association) in 1988, but has been administered by ASTM International since 2008.

7. … woven or knitted from polyester … are used extensively in apparel and home furnishings, from shirts and pants to jackets and hats, bed sheets, blankets, upholstered furniture and computer mouse mats.

8. Industrial … are used in tyre reinforcements, fabrics for conveyor belts, safety belts, coated fabrics and plastic reinforcements with high-energy absorption.

9. … is used as cushioning and insulating material in pillows, comforters and upholstery padding. Polyester fabrics are highly stain-resistant — in fact, the only class of dyes which *can* be used to alter the color of polyester fabric are what are known as disperse dyes.

10. Some countries banned expanded … and tableware around 1999. However, compliance has been a problem and, in 2013, the Chinese plastics industry is actively lobbying to get the ban repealed.

VI. Translate the following sentences from Russian into English.

1. Существует множество технологичеких процессов, направленных на переработку и последующее применение различных видов пластиков в производстве различной продукции.

2. Поскольку основной проблемой промышленной переработки пластики является сортировка пластика, разработана целая система дифференциации и определения типа пластика по маркировке типа смолы, из которой изготовлен полимер, а также универсальная автоматическая система определения типа пластмассы.

3. На многих предприятиях, целью которых является доход от переработки пластика, применяют простую ручную сортировку отработанного пластика, несмотря на то что данный вид сортировки требует значительных временных затрат и является очень трудоемким и сложным.

4. Как правило, перерабатываемый пластик измельчается в легкий порошок из мельчайших хлопьев, на основе которого изготавливают многие полезные товары.

5. Во многих странах действует запрет на распространение полистероловых контейнеров.

6. Как правило, из вторичного пластика изготавливают пищевые и непищевые контейнеры.

7. Применение вторичного пластика в производственных целях развивается с каждым днем. Его применяют не только в производстве железнодорожных шпал, дорожных покрытий, асфальтов и битумов, но и в пошиве модной одежды, изготовлении мебельных покрытий, ковров и обоев.

8. Существует ряд программ, рассчитанных на повышение сознательности населения по отношению к проблемам окружающейц среды. Людей агитируют сортировать мусор в быту, собирать пластик на улицах и сдавать его в местные центры по переработки пластика.

VII. Make up 10 sentences about plastics and their chemical and physical properties, ways of recycling and ecological problems, which they cause, in English for your fellow-students to translate.

VIII. Act out a monologue of a professor of chemistry in Russian for your fellow-students to translate into English. Speak about plastics, their physical and chemical properties and their ways of application and recycling.

• Make up Russian-English dialogues for your group-mates to translate:

- Two owners of a plant discussing creating of new types of plastics, their basic properties, the problems of environment and recycling;

- a Russian and an English student of the department of chemistry speaking about properties and peculiarities of different plastics and polymers, the ways of their recycling, their ecological influence and the ways of its reducing;

- two businessmen who want to start their own plant producing plastic goods, discussing the ways of production of new plastics and recycling them;

- two proprietors trading plastic goods and discussing their peculiarities, the problems of public opinion, the ways of reducing environmental harm by recycling plastics;

- two ecologists discussing the problems of environmental effects of plastic, the ways of reducing them, the ways of creating new plastics which are environmentally friendly, the ways of recycling plastics.

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