ДОНСКОЙ ГОСУДАРСТВЕННЫЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ

УПРАВЛЕНИЕ ДИСТАНЦИОННОГО ОБУЧЕНИЯ И ПОВЫШЕНИЯ КВАЛИФИКАЦИИ

Кафедра «Иностранных языков»

Методические указания

по профессионально-ориентированному чтению текстов по дисциплине

«Английский язык»

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Ростов-на-Дону, 2016

Аннотация

Методические указания предназначены для бакалавров направления подготовки 29.03.04 «Технология художественной обработки материалов». Содержат тексты для разного вида чтения и перевода текстов на профессионально-ориентированную тематику, а так же серию лексико-грамматических упражнений.

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Оглавление

Unit I. MECHANICAL PROPERTIES OF MATERIALS.

1. Discuss in pairs:

What properties of materials do you know? Compare answers with your partner.

2.Read and translate the text to find out if you are right.

Text 1

Mechanical properties are important in structural and building materials as well as textile fabrics. They include the many properties used to describe the strength of materials such as: elasticity / plasticity, tensile strength, compressive strength, shear strength, fracture toughness & ductility (low in brittle materials), and indentation hardness.

Fracture mechanics is the field of mechanics concerned with the study of the formation and subsequent propagation of microcracks in materials. It uses methods of analytical solid mechanics to calculate the thermodynamic driving force on a crack and the methods of experimental solid mechanics to characterize the material's resistance to fracture and catastrophic failure.

In modern materials science, fracture mechanics is an important tool in improving the mechanical performance of materials and components. It applies the physics of stress and strain, in particular the theories of elasticity and plasticity, to the microscopic crystallographic defects found in real materials in order to predict the macroscopic mechanical failure of bodies. Fractography is widely used with fracture mechanics to understand the causes of failures and also verify the theoretical failure predictions with real life failures.

Thus, since cracks and other microstructural defects can lower the strength of a structure beyond that which might be predicted by the theory of crystalline objects, a different property of the material—above and beyond conventional strength—is needed to describe the fracture resistance of engineering materials. This is the reason for the need for fracture mechanics: the evaluation of the strength of flawed structures.

In this context, fracture toughness is a property which describes the ability of a material containing a crack to resist fracture, and is one of the most important properties of any material for virtually all design applications. Fracture toughness is a quantitative way of expressing a material's resistance to brittle fracture when a crack is present. If a material has a large value of fracture toughness it will probably undergo ductile fracture. Brittle fracture is very characteristic of materials with a low fracture toughness value.

These materials do show plastic deformation. However, due to the rigid structure of the crystalline materials, there are very few available slip systems for dislocations to move, and so they deform very slowly. With the non-crystalline (glassy) materials, viscous flow is the dominant source of plastic deformation, and is also very slow. It is therefore neglected in many applications of ceramic materials.

To overcome the brittle behaviour, ceramic material development has introduced the class of ceramic matrix composite materials, in which ceramic fibers are embedded and with specific coatings are forming fiber bridges across any crack. This mechanism substantially increases the fracture toughness of such ceramics. The ceramic disc brakes are, for example using a ceramic matrix composite material manufactured with a specific process.

3. Answer the questions:

1) What mechanical properties of materials do you know?
2) What is fracture mechanics and what does it apply?
3) What is the reason for the need for fracture mechanics?
4) What is fractography used for?
5) What is the most important properties of any material for all design applications?

4. State whether the following sentences are true or false. Correct the false ones.

1. Fracture mechanics uses methods of analytical solid mechanics to calculate the thermodynamic driving force on a crack.
2. Different property of the material is needed to describe the fracture resistance of engineering materials.
3. Fracture toughness is not taken into account as the most important properties of any material.
4. If a material has a large value of fracture toughness it shows plastic deformation.

5. Find out the words from the text which denote:

1) a break or crack in a very hard substance
2) the ability of a substance to stretch easily and then return to its original shape quickly
3) able to be bent, stretched or pressed
4) the science that deals with heat, light, and other forms of energy and how they affect objects
5) consisting of crystals or looking like crystals

6. Discuss the following items in pairs:

1) mechanical properties in structural and building materials
2) fracture mechanics

UNIT II. CERAMICS.

1. New words and word combinations to learn:

crystalline – кристаллический
insulator –изолятор
conductivity - электропроводность
melting temperature – температура плавления
figurine – статуэтка
silica – кремнезём
kiln – печь
tile – плитка
bearing – подшипник
sintered – спечённый

2. Read the text and find out the information about the origin of the word "ceramics".

Text 1. Types of ceramic products.

A ceramics is an inorganic, nonmetallic solid comprising metal, nonmetal or metalloid atoms primarily held in ionic and covalent bonds. The crystallinity of ceramic materials ranges from highly oriented to semi-crystalline, and often completely amorphous . Varying crystallinity and electron consumption in the ionic and covalent bonds cause most ceramic materials to be good thermal and electrical insulators and extensively researched in ceramic engineering.

Nevertheless, with such a large range of possible options for the composition/structure of a ceramics (e.g. nearly all of the elements, nearly all types of bonding, and all levels of crystallinity), the breadth of the subject is vast, and identifiable attributes (e.g. hardness, toughness, electrical conductivity, etc.) are hard to specify for the group as a whole. However, generalities such as high melting temperature, high hardness, poor conductivity, high elasticity, chemical resistance and low ductility are the norm, with known exceptions to each of these rules (e.g. piezoelectric ceramics, glass transition temp, superconductive ceramics, etc.). Many composites, such as fiberglass and carbon fiber, while containing ceramic materials, are not considered to be part of the ceramic family.

The word "ceramics" comes from the Greek word κεραμικός (keramikos), "of pottery" or "for pottery", from κέραμος (keramos), "potter's clay, tile, pottery". The earliest known mention of the root "ceram-" is the Mycenaean Greek ke-ra-me-we, "workers of ceramics", written in Linear B syllabic script. The word "ceramic" may

be used as an adjective to describe a material, product or process; or it may be used as a noun, either singular, or more commonly, as the plural noun "ceramics".

The earliest ceramics made by humans were pottery objects, including 27,000 year old figurines, made from clay, either by itself or mixed with other materials like silica, hardened, sintered, in fire. Later ceramics were glazed and fired to create smooth, colored surfaces, decreasing porosity through the use of glassy, amorphous ceramic coatings on top of the crystalline ceramic substrates. Ceramics now include domestic, industrial and building products, as well as a wide range of ceramic art. In the 20th century, new ceramic materials were developed for use in advanced ceramic engineering.

For convenience, ceramic products are usually divided into four sectors:

Structural, including bricks, pipes, floor and roof tiles. Refractories, such as kiln linings, gas fire radiants, steel and glass making crucibles. White wares, including tableware, cookware, wall tiles, pottery products and sanitary ware.

Technical, is also known as engineering, advanced, special, and fine ceramics. Such items include: tiles used in the Space Shuttle program, gas burner nozzles, ballistic protection, nuclear fuel uranium oxide pellets, biomedical implants, coatings of jet engine turbine blades, ceramic disk brake, missile nose cones, bearing (mechanical), etc.

3. Answer the following questions :

1. What is ceramics?
2. What do you know about the crystallinity of ceramic materials?
3. What were the earliest ceramics made by human?
4. What do the ceramics include nowadays?
5. What sectors are the ceramic products divided?

4. Find the English equivalents for the following words and word combinations in the text:

1) твёрдое вещество, содержащее металл
2) ковалентные связи
3) тепло- и электро- изолятор
4) стекловолокно
5) углеродное волокно
6) кремнезём, закалённый и спечённый в огне
7) уменьшение пористости

8) аморфное керамическое покрытие

5. Translate the sentences into English:

1) Керамика – это неорганическое, неметаллическое твердое вещество, содержащее металл, неметаллические или металлоидные атомы, которые в основном удерживаются в ионных и ковалентных связях.

2) Изменение кристалличности и потребление электронов в ионных и ковалентных связях является причиной того, что большинство керамических материалов – хорошие тепловые и электрические изоляторы и широко изучаются в инженерии керамики.

3) Общие черты, такие как высокая температура плавления, высокая твердость, плохая проводимость, высокая эластичность, химическая стойкость и низкая пластичность являются нормой, с известными исключениями к каждому из этих правил.

4) Самые ранние керамические изделия, сделанные людьми, были объектами керамики, в том числе фигурки, сделанные из глины, либо в смеси с другими материалами, такими как диоксид кремния, закаленного, спечённого в огне.

5) Керамику покрывали глазурью и обжигали, чтобы создать гладкие, цветные поверхности, уменьшающие пористость за счет использования стекловидных аморфных, керамических покрытий на верхней части кристаллических керамических подложек.

6) Керамические изделия, как правило, делятся на четыре сектора:

– структурные, в том числе кирпичи, трубы, полы и черепицы.

– огнеупорная керамика, такая как – излучатели газового пожаротушения, печи для производства стали и стекла.

– прозрачные изделия, в том числе столовая и кухонная посуда, облицовочная плитка, гончарные изделия и сантехника.

– техническая, специальная и высококачественная керамики.

6. Make up a plan of the text.

7. Discuss the text with your partner according to your plan.

Text 2. Applications of ceramics.

1. New words and word combinations to learn:

ball bearing – шарикоподшипник
rolling – прокатка
rust – ржавчина
susceptibility – восприимчивость
brittle – хрупкий
penetrate – проникать
payload – полезная нагрузка
blade – лезвие

2. Read the text and gain facts about the hydroxyapatite ceramics and its application.

Ceramics can be used instead of steel for ball bearings. Their higher hardness means they are much less susceptible to wear and typically last for triple the lifetime of a steel part. They also deform less under load, meaning they have less contact with the bearing retainer walls and can roll faster. In very high speed applications, heat from friction during rolling can cause problems for metal bearings, which are reduced by the use of ceramics.

Ceramics are also more chemically resistant and can be used in wet environments where steel bearings would rust. In some cases, their electricity-insulating properties may also be valuable in bearings. Two drawbacks to ceramic bearings are a significantly higher cost and susceptibility to damage under shock loads.

Knife blades: the blade of a ceramic knife will stay sharp for much longer than that of a steel knife, although it is more brittle and can snap from a fall onto a hard surface. Ceramic brake disks for vehicles are resistant to abrasion at high temperatures.Advanced composite ceramic and metal matrices have been designed for most modern armoured fighting vehicles because they offer superior penetrating resistance against shaped charges.

In the early 1980s, Toyota researched production of an adiabatic engine using ceramic components in the hot gas area. The ceramics would have allowed temperatures of over 1650 °C. The expected advantages would have been lighter materials and a smaller cooling system, leading to a major weight reduction. The expected increase of fuel efficiency of the engine could not be verified experimentally; it was found that the heat transfer on the hot ceramic cylinder walls was higher than the transfer to a cooler metal wall as

the cooler gas film on the metal surface works as a thermal insulator.

Thus, despite all of these desirable properties, such engines have not succeeded in production because of costs for the ceramic components and the limited advantages. Such engines are possible in laboratory settings, but mass production is not feasible with current technology. Work is being done in developing ceramic parts for gas turbine engines. Currently, even blades made of advanced metal alloys used in the engines' hot section require cooling and careful limiting of operating temperatures. Turbine engines made with ceramics could operate more efficiently, giving aircraft greater range and payload for a set amount of fuel.

Recent advances have been made in ceramics which include bioceramics, such as dental implants and synthetic bones. Hydroxyapatite, the natural mineral component of bone, has been made synthetically from a number of biological and chemical sources and can be formed into ceramic materials. Orthopedic implants coated with these materials bond readily to bone and other tissues in the body without rejection or inflammatory reactions so are of great interest for gene delivery and tissue engineering scaffolds.

Most hydroxyapatite ceramics are very porous and lack mechanical strength, and are used to coat metal orthopedic devices to aid in forming a bond to bone or as bone fillers. They are also used as fillers for orthopedic plastic screws to aid in reducing the inflammation and increase absorption of these plastic materials. Work is being done to make strong, fully dense nanocrystalline hydroxyapatite ceramic materials for orthopedic weight bearing devices, replacing foreign metal and plastic orthopedic materials with a synthetic, but naturally occurring, bone mineral. Ultimately, these ceramic materials may be used as bone replacements or with the incorporation of protein collagens, synthetic bones.

High-tech ceramic is used in watch making for producing watch cases. The material is valued by watchmakers for its light weight, scratch resistance, durability and smooth touch.

3. Read the text again and answer the following questions:

1. What application of different types of ceramic can you name?
2. What do you know about the application of ceramic in wet environments?
3. What have the advanced composite ceramic and metal matrices been designed for?
4. Why have the ceramic engines not succeeded in production?

5. What the recent advances in the field of ceramic do you know?

4. State whether the following sentences are true or false. Correct the false ones.

1. Ceramics are much less susceptible to wear and typically last for triple the lifetime of a steel part.
2. Ceramics are also more chemically resistant and can be used in wet environments like steel bearings would rust.
3. Ceramic brake disks for vehicles are resistant to abrasion at high temperatures.
4. Turbine engines made with ceramics couldn't operate more efficiently, giving aircraft greater range and payload for a set amount of fuel.
5. Hydroxyapatite wasn't made synthetically from a number of biological and chemical sources and couldn't be formed into ceramic materials.

5. Match two columns to make up collocations and give their Russian equivalents.

1. recent	a) component
2. ball	b) hydroxyapatite
3. ceramics	c) orthopedic
4. blades	d) bearings
5. mineral	e) advances
6. devices	f) knife

6. Discuss the following items in pairs:

1. the recent advances in the field of ceramic
2. the properties of the hydroxyapatite ceramics

7. Make a report on the topic "High-tech ceramic".

UNIT III. METALWORKING.

1. New words and word combinations to learn:

nugget – самородок
precise – точный
tool – инструмент
malleable and ductile metal – ковкий и пластичный металл
smelting ores – выплавка руд
adornment – украшение
workpiece – заготовка
an anvil – наковальня
low oxidation – низкий уровень окисления

2. Read the text and find out which paragraph gives information about the archaeological evidence of copper mining and working.

Text 1. The Notion of Metalworking

Metalworking is the process of working with metals to create individual parts, assemblies, or large-scale structures. The term covers a wide range of work from large ships and bridges to precise engine parts and delicate jewelry. It therefore includes a correspondingly wide range of skills, processes, and tools.

Metalworking is a science, art, hobby, industry and trade. Its historical roots span cultures, civilizations, and millennia. Metalworking has evolved from the discovery of smelting various ores, producing malleable and ductile metal useful for tools and adornments. Modern metalworking processes, though diverse and specialized, can be categorized as forming, cutting, or joining processes. Today's machine shop includes a number of machine tools capable of creating a precise, useful workpiece.

The oldest archaeological evidence of copper mining and working was the discovery of a copper pendant in northern Iraq from 8,700 BC.The earliest substantiated and dated evidence of metalworking in North America was the processing of copper in Wisconsin, near Lake Michigan. Copper was hammered until brittle then heated so it could be worked some more. This technology is dated to about 4000-5000 BC. The oldest gold artifacts in the world come from the Bulgarian Varna Necropolis and date from 4450 BC.

Not all metal required fire to obtain it or work it. Isaac Asimov speculated that gold was the "first metal". His reasoning is that gold by its chemistry is found in nature as nuggets of pure gold. There are

a few other metals that sometimes occur natively, and as a result of meteors. Almost all other metals are found in ores, a mineral bearing rock, that require heat or some other process to liberate the metal. Another feature of gold is that it is workable as it is found, meaning that no technology beyond eyes to find a nugget and a hammer and an anvil to work the metal is needed. Stone hammer and stone anvil will suffice for technology. This is the result of gold's properties of malleability and ductility. The earliest tools were stone, bone, wood, and sinew. They sufficed to work gold.

At some point the connection between heat and the liberation of metals from rock became clear, rocks rich in copper, tin, and lead came into demand. These ores were mined wherever they were recognized. Remnants of such ancient mines have been found all over what is today the Middle East.Metalworking was being carried out by the South Asian inhabitants of Mehrgarh between 7000–3300 BC.The end of the beginning of metalworking occurs sometime around 6000 BC when copper smelting became common in the Middle East.

Copper ore, being relatively abundant, and tin ore became the next important players in the story of metalworking. Using heat to smelt copper from ore, a great deal of copper was produced. It was used for both jewelry and simple tools. However, copper by itself was too soft for tools requiring edges and stiffness. At some point tin was added into the molten copper and bronze was born. Bronze is an alloy of copper and tin. Bronze was an important advance because it had the edge-durability and stiffness that pure copper lacked. Until the advent of iron, bronze was the most advanced metal for tools and weapons in common use.

The ancients knew of seven metals. Their oxidation potential is important because it is one indicator of how tightly bound to the ore the metal is likely to be. Iron is significantly higher than the other six metals while gold is dramatically lower than the six above it. Gold's low oxidation is one of the main reasons that gold is found in nuggets. These nuggets are relatively pure gold and are workable as they are found.

Looking beyond the Middle East, these same advances and materials were being discovered and used the world around. China and Britain jumped into the use of bronze with little time being devoted to copper. Japan began the use of bronze and iron almost simultaneously. In the Americas things were different. Although the peoples of the Americas knew of metals, it wasn't until the arrival of Europeans that metal for tools and weapons took off. Jewelry and art were the principal uses of metals in the Americas prior to European

influence.

Around the date 2700 BC, production of bronze was common in locales where the necessary materials could be assembled for smelting, heating, and working the metal. Iron was beginning to be smelted. Iron began its emergence as an important metal for tools and weapons. The Iron Age was dawning.

3. Scan the text and answer the following questions:

1. What is metalworking?
2. How can modern metalworking processes be categorized?
3. What was the earliest evidence of metalworking in North America?
4. What did Isaac Asimov speculate about the gold?
5. When did copper smelting become common in the Middle East?
6. What was the cooper use for?
7. What is bronze and what are its properties?
8. Why is the oxidation potential of metals important?
9. What metals did the different countries use?

4. Match English words with their Russian equivalents :

1. to create	a) выплавка
2. assembly	b) станки
3. smelting	c) обильный
4. cutting	d) ювелирные изделия
5. machine tools	e) расплавленная медь
6. abundant	f) сборка
7. jewelry	g) создавать
8. molten copper	h) резка

5.Fill in the gaps with the words and phrases from the text:

1) The term "metalworking " covers . . . . from large ships and bridges to precise engine parts and delicate jewelry.

2) Metalworking has evolved from the discovery of smelting various ores, producing . . . . . useful for tools and adornments.

3) Today's machine shop includes a . . . . . capable of creating a precise, useful workpiece.

4) Copper was hammered until . . . . . so it could be worked some more.

5) Not all metal required . . . . . it or work it.

6) Almost all other metals are found in ores, a mineral bearing rock, ... or some other process to liberate the metal.

7) The earliest tools were . . . , bone, . . ., and sinew.

6. Translate the sentences into English:

1) Металлообработка – это процесс работы с металлами для создания отдельных частей, узлов или крупномасштабных структур.

2) Металлообработка развилась из открытия выплавки различных руд, производство ковкого и высокопрочного металла, пригодного для инструментов и украшений.

3) Современные процессы металлообработки разнообразны и специализированны, могут быть классифицированы как процессы формирования, резки или соединения.

4) Сегодня механическая мастерская включает в себя ряд станков, способных создать точную, полезную деталь.

5) Золото по своей химии встречается в природе в виде самородков чистого золота.

6) Самородки – это относительно чистое золото, которое может быть обработано сразу после добычи.

7) Почти все металлы находятся в рудах, минеральной горной породе, которые требуют тепла или какого-либо другого процесса, чтобы высвободить металл.

8) Металлообработка осуществлялась жителями Южной Азии между 7000-3300.

9) Бронза была важным достижением, потому что она имела прочность и жесткость, которых не хватало чистой меди.

10) Медная руда, будучи относительно в изобилии, и оловянная руда стали важными игроками в истории металлообработки.

7.Make a report on the topic "Metalworking".

Text 2. General metalworking processes.

1. New words and word combinations to learn:

handcraft – изготавливать вручную
caliper -штангенциркуль
eliminate – исключать
precisely measure – точно измерить
inner and outer diameter – внутренний и наружный диаметр
molten metal – расплавленный металл

die casting – литьё под давлением
sand casting – литьё в песчаные формы

2. Read the text and find the passage describing what the caliper is.

Metalworking generally is divided into the following categories : forming, cutting and joining. Each of these categories contain various processes. Prior to most operations, the metal must be marked out and/or measured, depending on the desired finished product.

Marking out (also known as layout) is the process of transferring a design or pattern to a workpiece and is the first step in the handcraft of metalworking. It is performed in many industries or hobbies, although in the repetition industries the need to mark out every individual piece is eliminated. In the metal trades area, marking out consists of transferring the engineer's plan to the workpiece in preparation for the next step.

Calipers are hand tools designed to precisely measure the machining or manufacture distance between two points. Most calipers have two sets of flat, perpendicular edges used for inner or outer diameter. Different types of calipers have different mechanisms for displaying the distance measured. Where larger objects need to be measured with less precision, a tape measure is often used.

Casting achieves a specific form by pouring molten metal into a mold and allowing it to cool, with no mechanical force. Forms of casting include investment casting (called lost wax casting in art).

Investment casting is an industrial process based on and also called lost-wax casting, one of the oldest known metal-forming techniques. From 5,000 years ago, when beeswax formed the pattern, to today’s high-technology waxes, refractory materials and specialist alloys, the castings allow the production of components with accuracy, repeatability, versatility and integrity in a variety of metals and high-performance alloys. Lost-foam casting is a modern form of investment casting that eliminates certain steps in the process.

The process is generally used for small castings, but has been used to produce complete aircraft door frames, steel castings of up to 300 kg and aluminium castings of up to 30 kg . It is generally more expensive per unit than die casting or sand casting, but has lower equipment costs. It can produce complicated shapes that would be difficult or impossible with die casting, yet like that process, it requires little surface finishing and only minor machining.

Centrifugal casting or rotocasting is a casting technique that is

typically used to cast thin-walled cylinders. It is noted for the high quality of the results attainable, particularly for precise control of their metallurgy and crystal structure. Unlike most other casting techniques, centrifugal casting is chiefly used to manufacture stock materials in standard sizes for further machining, rather than shaped parts tailored to a particular end-use.

Die casting is a metal casting process that is characterized by forcing molten metal under high pressure into a mold cavity. The mold cavity is created using two hardened tool steel dies which have been machined into shape and work similarly to an injection mold during the process. Most die castings are made from non-ferrous metals, specifically zinc, copper, aluminium, magnesium, lead, pewter and tin based alloys. Depending on the type of metal being cast, a hot- or cold-chamber machine is used.

The casting equipment and the metal dies represent large capital costs and this tends to limit the process to high volume production. Manufacture of parts using die casting is relatively simple, involving only four main steps, which keeps the incremental cost per item low. It is especially suited for a large quantity of small to medium sized castings, which is why die casting produces more castings than any other casting process. Die castings are characterized by a very good surface finish (by casting standards) and dimensional consistency.

3. Scan the text and answer the questions:

1) What categories is metalworking generally divided into?
2) What is marking out?
3) What does marking out consist of in the metal trades area?
4) What is caliper?
5) How does casting achieve a specific form?
6) What process is based on lost-wax casting, one of the oldest known metal-forming techniques?
7) What can produce complicated shapes that would be difficult or impossible with die casting?
8) What is die casting?
9) What are die castings made from?

4. Find the English equivalents to the following words and word combinations in the text:

1) формовка
2) шаблон
3) заготовка

4) обработка и изготовление
5) различные механизмы для отображения расстояния
6) повторяемость, универсальность и целостность
7) центробежное литье
8) тонкостенные цилиндры
9) точный контроль
10) полость литейной формы

5. State whether the following sentences are true or false:

1) Metalworking generally is divided into the forming, cutting, joining and forging.

2) Calipers have two sets of flat, perpendicular edges used for inner or outer diameter.

3) Investment casting is an industrial process based on and also called lost-wax casting, one of the newest metal-forming techniques.

4) Lost-foam casting is a modern form of investment casting that eliminates certain steps in the process.

5) Die castings are made from ferrous metals, specifically zinc, copper, aluminium, magnesium, lead, pewter and tin based alloys.

6. Follow the keywords of each part of the text and make up a plan of it.

- Metalworking
- Marking out
- Calipers
- Casting, forms of casting
- The casting equipment

7. Retell the text according to your plan.

UNIT IV. JEWELLERY-MAKING AS A TYPE OF ARTISTIC PROCESSING OF MATERIAL

Text 1. Basic notes on Jewellery

1. New words and word combinations to learn:
Jewellery – драгоценности, ювелирное дело
necklace – ожерелье
brooch – брошь
earrings – серьги
bracelet – браслет
gemstone [dʒɛmstəʊn] – драгоценный камень
beads – бусины, бисер
adornment – украшение
amber – янтарь
enamel – эмаль, финифть
hairpin – шпилька для волос
Christian crucifix – Христианское распятие (“крестик”, ювел.)
dowry – приданое
buckle – пряжка, подвеска
diminish – уменьшать, убавлять

2. Discuss the following questions in pairs:
1. Do you know what the term “jewellery” mean?
2. Why do people use jewellery?
3. Where did jewellery appear first?
4. What materials are generally used for jewellery-making?

3. Read the text to check your ideas.

The word jewellery itself is derived from the word “jewel”, which was anglicized from the Old French "jouel", and beyond that, to the Latin word "jocale", meaning “plaything”. In British English, New Zealand English, Hiberno-English, Australian English, and South African English it is spelled jewellery, while the spelling is jewelry in American English. Both are used in Canadian English.

Jewellery or jewelry are small decorative items worn for personal adornment, such as brooches, rings, necklaces, earrings, and bracelets. Jewellery may be attached to the body or the clothes, and the term is restricted to durable ornaments, excluding flowers for example.

For many centuries *metal*, often combined with *gemstones*, has

been the normal material for jewellery, but other materials such as shells and other plant materials may be used. It is one of the oldest type of archaeological artefact – with 100,000-year-old beads made from Nassarius shells thought to be the oldest known jewellery. The basic forms of jewellery vary between cultures but are often extremely long-lived. In European cultures the most common forms of jewellery listed above have persisted since ancient times, while other forms such as adornments for the nose or ankle, important in other cultures, are much less common.

Historically, the most widespread influence on jewellery in terms of design and style have come from Asia.

Jewellery may be made from a wide range of materials, but gemstones and similar materials such as amber and coral, precious metals, beads, and shells have been widely used, and enamel has often been important. In most cultures jewellery can be understood as a status symbol, for its material properties, its patterns, or for meaningful symbols. Jewellery has been made to adorn nearly every body part, from hairpins to toe rings. The patterns of wearing jewellery between the sexes, and by children and older people can vary greatly between cultures, but adult women have been the most consistent wearers of jewellery; in modern European culture the amount worn by adult males is relatively low compared with other cultures and other periods in European culture.

Humans have used jewellery for a number of different reasons. From the point of view of functionality, people use jewellery items to fix clothing or hair in place, or to tell the time (in the case of watches). Jewellery can demonstrate either social or personal status, as with a wedding ring. Jewellery can also symbolise group membership (as in the case of the Christian crucifix or the Jewish Star of David). Thus, pieces of jewellery can act as a signifier of some form of affiliation, whether ethnic, religious or social. It can even provide talismanic protection in the form of amulets for those who believe it.Wearing of amulets and devotional articles to provide protection or ward off evil is common in some cultures; these may take the form of symbols (such as the ankh), stones, plants, animals, body parts (such as the Khamsa), or glyphs (such as stylised versions of the Throne Verse in Islamic art).

Most cultures at some point have had a practice of keeping large amounts of wealth stored in the form of jewellery. Numerous cultures store wedding dowries in the form of jewellery or make jewellery as a means to store or display coins. Alternatively, jewellery has been used as a currency or trade good; an example being the use

of slave beads.

Many items of jewellery, such as brooches and buckles, originated as purely functional items, but evolved into decorative items as their functional requirement diminished.

4. Look through the text again and match the English equivalents to their Russian ones

1. decorative item	a) выступать в качестве символа
2. functional requirements	b) принадлежность
3. currency	c) быть производным; происходить от (о слове)
4. to act as a signifier	d) прикреплять
5. affiliation	e) символизировать
6. to be derived from	f) декоративный элемент
7. to symbolise	g) значимые символы
8. to attach	h) функциональные требования
9. meaningful symbols	i) предметы (религиозного) культа
10. devotional articles	j) валюта, деньги

5. State whether the following statements are true or false

1. The word jewellery is derived from the ancient word denoting "plaything".
2. Jewellery is worn for personal adornment.
3. Flowers can also be reffered to as jewellery.
4. Jewellery include only durable ornamrnts.
5. The most widespread influence on jewellery in terms of design and style have come from Europe.
6. Jewellery is made of only gemstones and precious metals.
7. In some cultures jewellery can perform symbolic functions alongside decorative ones.

6. Make up a plan of the text and retell it according to your plan.

Text 2. Materials and methods used in jewellery-making

1. New words and word combinations to learn:

Precious – ценный
gold – золото
contemporary – современный
platinum – платина
palladium – палладий
titanium – титан
purity – чистота
alloy – сплав
enamel – эмаль, финфть
encompass – охватывать

2. Read the text and translate it.

In creating jewellery, gemstones, coins, or other precious items are often used, and they are typically set into precious metals. Alloys of nearly every metal known have been encountered in jewellery. *Bronze,* for example, was common in Roman times. Modern fine jewellery usually includes *gold, white gold, platinum, palladium, titanium, or silver*.

Most contemporary gold jewellery is made of an *alloy of gold,* the purity of which is stated in karats, indicated by a number followed by the letter K. American gold jewellery must be of at least 10K purity (41.7% pure gold), (though in the UK the number is 9K (37.5% pure gold) and is typically found up to 18K (75% pure gold). Higher purity levels are being considered too soft for jewellery use in America and Europe. These high purity alloys, however, are widely used across Asia, the Middle East and Africa. Platinum alloys range from 900 (90% pure) to 950 (95.0% pure). The silver used in jewellery is usually sterling silver, or 92.5% fine silver. In costume jewellery, stainless steel findings are sometimes used.

Other commonly used materials include glass, such as fused-glass or enamel; wood, often carved or turned; shells and other natural animal substances such as bone and ivory, natural clay, polymer clay.

Beads are frequently used in jewellery. These may be made of glass, gemstones, metal, wood, shells, clay and polymer clay. Beaded jewellery commonly encompasses necklaces, bracelets, earrings, belts and rings. Beads may be large or small. The smallest type of beads used are known as seed beads, these are the beads used for the "woven" style of beaded jewellery. Another use of seed beads is an

embroidery technique where seed beads are sewn onto fabric backings to create broad collar neck pieces and beaded bracelets. Bead embroidery, a popular type of handwork during the Victorian era, is enjoying a renaissance in modern jewellery making. Beading, or beadwork, is also very popular in many African and indigenous North American cultures.

Advanced glass and glass beadmaking techniques by Murano and Venetian glassmasters developed crystalline glass, enamelled glass (smalto), glass with threads of gold (goldstone), multicoloured glass (millefiori), milk-glass (lattimo), and imitation gemstones made of glass. As early as the 13th century, Murano glass and Murano beads were popular.

Silversmiths, goldsmiths, and lapidaries methods include forging, casting, soldering or welding, cutting, carving and "cold-joining" (using adhesives, staples and rivets to assemble parts).

3. Look through the text again and find the russian equivalents to the following words:

Higher purity level, fused-glass, sterling silver, costume jewellery, stainless steel, natural animal substances, embroidery technique, glass beadmaking technique, Bead embroidery, indigenous cultures.

4. Complete the sentences using the information from the text:

1. Most contemporary gold jewellery is made of …..
2. Higher purity levels are being considered.....
3. The silver used in jewellery is usually.....
4. ……. may be made of glass, gemstones, metal, wood, shells, clay and polymer clay.
5. Another use of seed beads is.....

5. Scan the text again and write out all the jewellery-making materials you come across.

6. What methods are used in making jewellery? Look through the text and name at least 5 of them.

7. Make a report on any of the methods of jewellery-making mentioned in the text.

8. In small groups discuss what you already know about precious metals from your basic course of studies.

Text 3. Precious metals. General information

1. New words to learn:

fine jewelry – утонченные драгоценности
Precious metal — драгоценный метал
chemical element – химический элемент
ruthenium – рутений
rhodium – родий
palladium – палладий
osmium – осмий
iridium – иридий
demand – спрос

2. Read the text and fill each gap with a suitable word from the box

Historically	currency	jewellery	include
which	precious	practical	elements

A (1) _____ metal is a rare, naturally occurring metallic chemical element of high economic value. Chemically, the precious metals tend to be less reactive than most (2) _____. They are usually ductile and have a high lustre. Historically, precious metals were important as (3) _____ but are now regarded mainly as investment and industrial commodities. Gold, silver, platinum, and palladium each have an ISO 4217 currency code.

The best-known precious metals are the coinage metals, gold and silver. Although both have industrial uses, they are better known for their uses in art, (4) _____ and coinage. Other precious metals (5) _____ the platinum group metals: ruthenium, rhodium, palladium, osmium, iridium, and platinum, of (6) _____ platinum is the most widely traded.

The demand for precious metals is driven not only by their (7) _____ use but also by their role as investments and a store of value. (8) _____, precious metals have commanded much higher prices than common industrial metals.

3. Read the text again and answer the following questions

1. What is a precious metal?
2. Precious metals are less reactive then other chemical elements, aren`t they?

3. What used to be regarded as currency in the past?
4. What are the most common precious metals?
5. What metals refer to the platinum group?

Text 4. Gold

1. Read the text and choose the most suitable heading for each numbered paragraph:

1. Chemical interaction with other substances
2. Ways of application
3. Gold as a chemical element
4. Cosmic influence on gold`s occurance on the Earth
5. Overall consumption
6. High-valued currency

(1._____) Gold is a chemical element with symbol Au *(from Latin: aurum)* and atomic number 79. It is a bright yellow dense, soft, malleable and ductile metal. The properties remain when exposed to air or water. Chemically, gold is a transition metal and a group 11 element. It is one of the least reactive chemical elements, and is solid under standard conditions. The metal therefore occurs often in free elemental (native) form, as nuggets or grains, in rocks, in veins and in alluvial deposits. It occurs in a solid solution series with the native element silver (as electrum) and also naturally alloyed with copper and palladium. Less commonly, it occurs in minerals as gold compounds, often with tellurium (gold tellurides).

(2._____) Gold's atomic number of 79 makes it one of the higher atomic number elements that occur naturally in the universe, and is traditionally thought to have been produced in supernova nucleosynthesis to seed the dust from which the Solar System formed. Because the Earth was molten when it was just formed, almost all of the gold present in the Earth sank into the planetary core. Therefore most of the gold that is present today in the Earth's crust and mantle is thought to have been delivered to Earth later, by asteroid impacts during the late heavy bombardment, about 4 billion years ago.

(3._____) Gold resists attacks by individual acids, but it can be dissolved by aqua regia (nitro-hydrochloric acid), so named because it dissolves gold into a soluble gold tetrachloride cation. Gold compounds also dissolve in alkaline solutions of cyanide, which have been used in mining. It dissolves in mercury, forming amalgam alloys; it is insoluble in nitric acid, which dissolves silver and base metals, a property that has long been used to confirm the presence of gold in items, giving rise to the term acid test.

(4._____) This metal has been a valuable and highly sought-after precious metal for coinage, jewelry, and other arts since long before the beginning of recorded history. In the past, a gold standard was often implemented as a monetary policy within and between nations, but gold coins ceased to be minted as a circulating currency in the 1930s, and the world gold standard was finally abandoned for a fiat currency system after 1976. The historical value of gold was rooted in its medium rarity, easy handling and minting, easy smelting, non-corrosiveness, distinct color, and non-reactivity to other elements.

(5._____) A total of 174,100 tonnes of gold have been mined in human history, according to GFMS as of 2012. This is roughly equivalent to 5.6 billion troy ounces or, in terms of volume, about 9020 m3, or a cube 21 m on a side. The world consumption of new gold produced is about 50% in jewelry, 40% in investments, and 10% in industry.

(6._____) Gold's high malleability, ductility, resistance to corrosion and most other chemical reactions, and conductivity of electricity have led to its continued use in corrosion resistant electrical connectors in all types of computerized devices (its chief industrial use). Gold is also used in infrared shielding, colored-glass production, and gold leafing. Certain gold salts are still used as anti-inflammatories in medicine.

2. Look through the text again and find the English equivalents to the following Russian words and phrases. Make sentences with these words and phrases.

химический элемент, пластичный, переходный металл, самородки, синтез химических элементов (нуклеосинтез), расплавленный (жидкий), кора и мантия Земли, растворимое золото, щелочной раствор, азотная кислота, кредитно-денежная политика, чеканить (о монетах), легкоплавкость, коррозиоустойчивость, инфракрасное экранирование, сусальное золото

3. Make a summary of the text and retell it.

Text 5. Gold in Jewelry

1. New words and word combinations to learn:

softness – мягкость
pure (24k) gold – чистое 24-каратное золото (999 проба)
ductility – проводимость
copper – медь
Eighteen-carat gold – 18-каратное золото (750 проба)

copper cast – медный отлив (оттенок)
brittle – ломкий, хрупкий
greenish-yellow – желто-зеленый
white gold alloys – сплавы белого золота

2. Look through the text and find out what gold alloys are used in jewelery-making.

Because of the softness of pure (24k) gold, it is usually alloyed with base metals for use in jewelry, altering its hardness and ductility, melting point, color and other properties. Alloys with lower carat rating, typically 22k, 18k, 14k or 10k, contain higher percentages of copper or other base metals or silver or palladium in the alloy. Copper is the most commonly used base metal, yielding a redder color.

Eighteen-carat gold containing 25% copper is found in antique and Russian jewelry and has a distinct, though not dominant, copper cast, creating rose gold. Fourteen-carat gold-copper alloy is nearly identical in color to certain bronze alloys, and both may be used to produce police and other badges. Blue gold can be made by alloying with iron and purple gold can be made by alloying with aluminium, although rarely done except in specialized jewelry. Blue gold is more brittle and therefore more difficult to work with when making jewelry.

Fourteen- and eighteen-carat gold alloys with silver alone appear greenish-yellow and are referred to as green gold. White gold alloys can be made with palladium or nickel. White 18-carat gold containing 17.3% nickel, 5.5% zinc and 2.2% copper is silvery in appearance. Nickel is toxic, however, and its release from nickel white gold is controlled by legislation in Europe.

Alternative white gold alloys are available based on palladium, silver and other white metals, but the palladium alloys are more expensive than those using nickel. High-carat white gold alloys are far more resistant to corrosion than are either pure silver or sterling silver. The Japanese craft of Mokume-gane exploits the color contrasts between laminated colored gold alloys to produce decorative wood-grain effects.

By 2014 the gold jewelry industry was escalating despite a dip in gold prices. Demand in the first quarter of 2014 pushed turnover to $23.7 billion according to a World Gold Council report.

3. Match the English words with their Russian equivalents:

1. laminated	a) сплавы палладия
2. base metals	b) токсичный

3. controlled by legislation	c) слоистый
4. to alter	d) эффекты древесной структуры
5. palladium alloys	e) падение цен
6. toxic	f) контролируется законодательством
7. silvery in appearance	g) неблагородные металлы
8. wood-grain effects	h) изменять
9. a dip in prices	I) самый широкораспространенный
10. the most commonly used	j) серебристый по внешнему виду

4. Scan the text and state whether the following statements are true or false

1. Pure gold is usually alloyed with base metals for use in jewelry in order to alter its hardness and ductility, melting point, color and other properties.
2. Pure gold is rather soft for practical use in jewellery.
3. Eighteen-carat gold containing 25% copper has a distinct, though not dominant, copper cast, creating rose gold.
4. Blue gold can be made by alloying with aluminium and purple gold can be made by alloying with iron.
5. Blue gold is widely used in jewelry.
6. Fourteen- and eighteen-carat gold alloys with silver are referred to as green gold.
7. White gold alloys can be made with palladium or nickel.
8. Palladium alloys are less expensive than those using nickel.
9. High-carat white gold alloys are far more resistant to corrosion than are either pure silver or sterling silver.
10. Nowadays the volumes of production in jewellery industry decrease in comparison with the previous years.

5. Read the text again and answer the following questions

1. Why is it necessary to alter the natural physical properties of pure gold in jewelry industry?
2. What gold alloys are most widely used?
3. What metal makes the gold alloy rose?
4. Is blue gold hard or brittle?
5. What metals are used in production of a white gold?

6. In small groups discuss the characteristics of different gold alloys.

ЛИТЕРАТУРА

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