Materials of Conferences

SYSTEM AND ACTIVITY APPROACH TO MINERAL SUBSTANCES' CHEMICAL PROPERTIES LEARNING

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The paramount task of present-day education, when the amount of knowledge subjected to adoption develops rapidly, is the one of the formation of an integral system approach to the apprehension of natural and social world's phenomena.

In connection with this a primary concern is being acquired by the academic activity projecting on the activity theory principles and system-structural approach, which allow forming a system mode of thinking, opening new cognitive opportunities of learners, growing their creative potential.

The developed by us an inorganic chemistry school course model based on the ideas of system-activity approach constructs the school subject newly – it appears as a research program of the specified subject, wherein the system-analysis method is laid; it organizes the cognitive movement in the subject and it is it that becomes a scheme of the advisory activity reflecting mentally the subject's image in its system-structural framework. Necessary knowledge properties as the advisory basis of the formed skills are laid in it: their fullness, consistency, generalization and, the main thing – the future mode of thought.

The consideration of the studied object as a system allows treating the selection and content structuring of the school subject differently and, therefore, its expression by the education program. The content includes: integral system properties, levels of its structure, structures of various levels, intra- and inter-level relations, the variety of system options and their features.

At the system approach to the variety of particular phenomena of the studied area it is necessary to mark an invariant of the system and then to consider separate cases as individual variants. So, we suggest studying chemical properties of mineral substances in the direction "from general to particular" – towards greater differentiation, specification of chemical properties. Such an order of studying provides a successive refinement and supplement of the studied earlier, allows adding on the relations within the system, and forms the seeing of more and more "fine" relations between various substances.

According to the suggested logic the educational material of the course is divided into levels in such a way that every next one "cut out" a more and more deep layer of the subject material specifying and concretizing the previous knowledge:

1 level – Principal genetic series of metals and non-metals.

2 level – Genetic series of metals forming soluble and insoluble alkalis.

3 level –Relations between the classes of substances, which are in the principal genetic series of metals and non-metals.

4 level –Characteristics of acid-base properties of oxides and corresponding to them hydroxides.

5 level - Relations between the classes of substances from the acid, basic and amphoteric series.

6 level – Neutral, acidic and basic salts and methods of their formation.

7 level – All variants of genetic series for different chemical elements.

8 level – Relations between different genetic series of one and the same element.

We have also composed the schemes demonstrating genetic relations and the relations of transformation between the classes of substances in each level and being used in the academic activity as the schemes of advisory activity base, a system of exercises having been developed. While fulfilling these exercises relying on the represented schemes of relations between mineral substances, a complete generalized advisory base of the abilities to compose all possible genetic series of an element in various oxidation degrees; equations corresponding to changes within these series and also the equations of interaction between the compounds of various elements is formed in learners.

As the experimental approbation of the developed materials showed, due to the training organized in this very way not only the system of subject knowledge and skills is formed in learners, but also the development of intellectual abilities takes place and the system-based orientation in the studied subject is formed as well.

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GRAPHIC PRESENTATION REFINEMENT BY GDDR5 VIDEO MEMORY AND DIRECT X 10 PROGRAM INTRODUCTION

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The use of the "quickest" types of video memory, i.e. the memory with minimal access time, allows refining the quality of graphic presentation of a computer essentially. At the present time the quickest memory in the world GDDR5 with the capacity of 6 Gbps has been developed. A new 512 Mb capacity microchip is able to process up to 16 video signals of DVD-quality simultaneously. To compare, the data

transfer rate of the DDR2 computer RW memory makes 667 Mbps, i.e. 10 times less, and GDDR4 – about twice as less. The new graphic memory chip of the fifth series with data interchange dual-speed (Graphics Double Data Rate 5, GDDR5) is meant for powerful personal computers, workstations and electronic gaming machines of the new generation. The new 512 Mb capacity microchip (16 Mb X 32) is able to broadcast a mobile picture and the information attached to it at the rate up to 24 Gbps or process up to 16 video DVD-quality signals simultaneously. The microchip functions from the voltage of 1,5V and consumes the electric energy almost by 20% less than todays popular chips of video memory, GDDR3. A mass production of Samsung GDDR5 memory on the basis of 60 nm technology started in 2007. The GDDR5 chips had become a standard in the segment of high-performance decisions. Using DirectX9.0 it is possible to create high-quality three-dimensional scenes with a high degree on-line detailing. One of the main possibilities of this set of functions is the one to program graphics using shaders. Shaders use special programmable display card registers to create various graphic effects. The Shader Model 2.0 support begins with the DirectX9.0; earlier DirectX versions have no such a support; then more advanced kinds of shaders Shader Model 2.0b were developed, wherein the instruction length was extended and some advanced features were added. For this model of shaders a refreshed package DirectX9.0b was released. Then Shader Model 3.0 was elaborated, which considerably extended the graphics programmability, with this shader model there appeared a possibility of dynamic branching and the instruction length was extended essentially. For this programmable graphics model support an update version of the DirectX9.0c. In the DirectX10 there appeared an update shader model, Geometry Shader. For the tridimensionality effect creation on a plane surface two textures are necessary, the surface normal map and the normal map properly, i.e. the normal texture. One of the most virtual effects in terms of rendering is the Parallax Occlusion Mapping; its meaning is the same as in Bump Mapping, i.e. to create a fine surface with many small details on a multipolygonal model. The main difference of this effect from the Bump Mapping lies in the presence of the parallax effect. To create such an effect, three textures, the normal map, the map of normals and the height map, which creates a more real three-dimensional surface, are needed. For the efficient use of this effect it is necessary to combine the Bump Mapping and Parallax Occlusion Mapping. The DirectX10 is supported only by the operating system Windows Vista. In the DirectX10 there appeared a new conveyor (pipeline), which includes: an orthographic frame buffer; geometry shader; stream out.

Various kinds render possible to plug-in resources to various parts of the conveyor. They enable recirculating data; perform the access to the textures VS, GS and PS. The constant buffer makes possible to store more data, performs a quicker updating of constants; there appeared an opportunity to group constants into various buffers for more efficient servicing, thus, the DirectX9.0 restrictions vanish. The new possibilities involve a more efficient multipass delineation, for example, the animation computation is performed once, and the delineation on these data is performed a required quantity of times, that enables to reduce the load on the graph and data processors greatly as the calculations are performed only once. Also a so-called displacement mapping, which renders possible to create non-recurrent objects in the game; also this possibility enables creating vast landscapes and realize some other solutions. One more interesting feature is an alternative interpretation data. And, finally, a possibility to create effects on the basis of GPGPU methods, which allows performing simple physical calculations, has been added. It makes possible to retain the results of the GS (geometry shader) output operation, works with a variable quantity of entities. At the output operation all topologies are converted into primitive lists, into so-called “triangle list” entity and other lists. An alternative method of output into the structure/VB besides the delineation. The calculation of implications for entities is referred to new interesting possibilities in this area; for example, the triangles’ normals. The extrusion of shades’ sizes enables the animation on the GPU with stream out (impossible in the DirectX9), the extrusion is performed in the GS – generation of sides of shades’ sizes, the extrusion in the DirectX10 works by 20% quicker than in DirectX9.0.

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THE INVESTIGATION OF NEGATIVE CONSEQUENCES INDUCED BY ELECTRIC SYSTEM FLOWS OF REACTIVE POWER

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Reactive power must be generated immediately near its consumers, i.e. it is necessary to install compensating devices step-up a power factor of loads. An electric system elements transfer of reactive power is accompanied by watt losses, cause inadmissible supply voltage derating or supply voltage rise, account for reduce of electric system capacity.

In order that make sure that a setting of compensating devices is necessary negative consequences induced by electric system transfer of reactive power must be estimated.