

introduced using media resources is better perceived and more effective in communicating with people.

Furthermore, our future is closely connected with digital technologies, therefore, we should be able to use them for the purposes we want, because it is not only simplifies our life, but also makes it more interesting.

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GROWTH OF TWO KINDS OF COOPER SULFATE CRYSTALS IN DOMESTIC CONDITIONS

Purpose. Growth of poly- and monocrystals of copper sulfate in domestic conditions, using improvised means as chemical materials.

The problem. The investigation of the reality of growing copper sulfate crystals at home and the use of ready-made crystals in everyday life, the growth of a crystalline hydrate monocrystal of copper sulfate.

Object of study. Copper vitriol (sulfate) – transparent hygroscopic crystals of a triclinic form of bright blue color. It is a blue pentahydrate of copper sulfate. It is highly soluble in water, concentrated solutions of hydrochloric acid, dilute alcohol, poorly soluble in ethanol. In air, it gradually evaporates (loses crystallization water). It has a nauseating-metallic taste. Density: 2.284 g / cm³. Melting point: 1100 ° C. In nature, copper sulfate can occur in the form of minerals: chalcocyanite, chalcantite, butyl, etc. In industry, copper vitriol is obtained by dissolving copper in heated dilute sulfuric acid by blowing air or as a by-product of electrolytic refining of copper. It is mainly used to produce various copper compounds, including copper hydroxide. Also it is used in laboratories for dehydration of alcohols, is used in the manufacture of mineral varnishes and paints, acetate fiber. Anhydrous copper sulphate is a good moisture absorber and can be used to absolute ethanol, dehumidify gases (including air) and as moisture indicator. In building industry, an aqueous solution of copper sulfate is used to neutralize the effects of leaks, eliminate rust stains, and also to remove salt emissions («efflorescence») from brick, concrete and plaster surfaces, and as an antiseptic and fungicidal agent to prevent decay of wood. In agriculture, copper sulfate is used as an antiseptic, fungicide and copper-sulfur fertilizer. A solution of copper sulfate is used to wet the soil for disinfection and replacement of sulfur and copper deficiency. It is also used for the production of mineral paints, in medicine, as one of the components of electrolytic baths for copper plating, etc., and as part of spinning solutions in the production of acetate fiber. The pentahydrate crystals of copper sulfate $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ are used for decorative purposes, as well as for the preparation of an aqueous solution of copper sulfate.

Methods of research. The use of a rapid method for obtaining crystals of copper sulfate, according to which it is possible to obtain a «bunch» of blue crystals of optional shape, and a method that is much longer than the fast one. This method makes it possible to obtain a large monocrystal of copper sulfate.

Practical significance of the results. In both methods of investigation, at first one can encounter small crystals that began to grow on the walls and bottom of the

vessel for experiments. The most beautiful and accurate crystals can be used as seeds for growing crystals. The rest is worth dissolving and getting a new solution for growing crystals. It can be added to the growing crystal as the liquid evaporates from the container in which it grows.

Research results. According to the research results, two types of crystals of copper sulfate have been grown: single/monocrystals and polycrystals.

According to the first method, we used a saturated copper sulfate solution to prepare the crystal. To prepare the solution, 20 grams of salt per 100 ml of water at room temperature were used. Further on the string, a seed was suspended in a container with a solution, on which a gradual formation of polycrystals weighing 15.2 grams was happened (the first method). Next, the largest polycrystal was taken and suspended on a separate string in a saturated solution. After 1.5 months, the monocrystal grew, gained a mass of 13.36 grams (the second method).

Conclusions. The obtained monocrystal had a distinctive bright blue color and had a structure corresponding to the shape of the crystal lattice of the aqueous salt of copper sulfate. The crystal had a high density. After taking out of the solution, the crystals were coated with a colorless nail varnish to avoid overdrying, cracking, to avoid contact with the skin. And the resulting crystals (both poly- and monocrystals) were used for decorative purposes.

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