

SYNTHESIS OF INORGANIC PIGMENTS BASED ON COMPLEX COMPOUNDS

¹Hagberdiyeva Mohinur Khujaberdi qizi, ²Makhmatkulova Zukhra Kholmurodovna

¹Master's student of the Faculty of Natural Sciences of Tashkent State Pedagogical University
named after Nizami

²Faculty of Natural Sciences of Tashkent State Pedagogical University named after Nizami c.t.s.,
Associate professor

<https://doi.org/10.5281/zenodo.7640963>

Abstract. *We study the pigments synthesized on the basis of complex compounds, their classification, as well as the chemical composition of pigments. We will get acquainted with how pigments synthesized from complex compounds are classified according to the order and on their basis inorganic pigments. Pigments are classified on the basis of the following chemical, physical, technical, feasibility and sanitary and hygienic indicators. Inorganic pigments are made up of several types. In the case when the chemical elements present in their composition depend on the elements in the periodic table, the composition and properties of the dyes also change.*

Keywords: *complex compounds, pigments, color, classification, pH value of aqueous extract, dispersion, surface area, intensity, raw materials, inorganic raw materials, intermediate product, coloring substance.*

Introduction. Today, the number of products obtained on the basis of complex compounds is increasing. However, it should be noted that the demand for pigments obtained on the basis of complex compounds is also increasing. The industry of color dyes, including the basis of pigments, is developing. The wide and rapid development of this industry is the result of an increase in supply and demand for it. Quality raw materials are always in demand. At this point, we will get acquainted with what structure, composition and classification the pigments themselves, which are obtained on the basis of complex compounds, have.

There is no generally accepted classification of pigments yet. The first was E. E. Pigments were studied and classified by Wagner. He carried out pigmentation on the basis of certain representatives of the elements present in the periodic table. Such a classification turned out to be unsuitable, since pigments based on the elements present in one group exhibit different colors. At the same time requires going through various technical processes.

It is also impossible to classify by color, since in one group there are different pigments, the chemical and technical characteristics of which, as well as the properties of similar pigments, belong to different groups (for example, iron oxides). Later, due to interest in his work, the pigments were classified based on the following criterion.

The classification of pigments is based on two criteria:

- 1) color;
- 2) chemical character.

Using exactly the manashu classification of pigments, the following is a classification of Inorganic Pigments and a separate classification of pigments for special purposes. To describe the properties of pigments, several indicators are used, which are divided into 5 groups:

1. Chemical indicators: a) the main chemical composition; b) the presence of impurities; C) the content of water-soluble salts; d) the pH of the aqueous extract.
2. Physical indicators: a) crystal structure; b) particle shape; c) dispersion; d) refractive index; e) color; f) hardness; g) special surface area; h) bulk weight and bulk volume.
3. Technical indicators: a) hiding power; b) oil absorption; C) intensity; d) heat resistance; e) light sensitivity; f) corrosion resistance; g) weather resistance; h) stability when mixed with other pigments.
4. Technical and economic indicators (rationality of production): a) cost of raw materials; b) availability of raw materials; C) complexity of production.
5. Sanitary and hygienic indicators: a) harmfulness of production; b) the harmfulness of the application.

Research materials and methodology. The pH of the aqueous extract of pigments should be within 6.5–7.5. The crystallinity of pigments depending on external conditions, there are three states of aggregate matter, each of which differs in the nature of the movement of particles, which, in turn, depends on the type of their connection with each other. According to the degree of distribution between solid bodies, a crystalline state is distinguished, characterized by a strictly defined direction of particles relative to each other. Obtaining crystals from solutions is called crystallization.

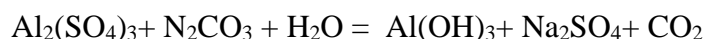
One of the methods for obtaining highly saturated solutions is the chemical interaction of substances. If, as a result, a chemical reaction produces a poorly soluble substance, then with time its concentration is higher than its solubility, and the solution becomes extremely saturated in relation to it. Crystallization involves two processes:

- 1) the growth of existing crystallization centers due to the deposition of new molecular layers;
- 2) the appearance of crystallization centers.

Depending on the circumstances, these processes proceed at different rates. Depending on the type of structural elements and the nature of the predominance of the connection between them, crystals are divided into: According to him Atomic (covalent bond), Ionic (ionic bond), molecular (molecular gravitational forces) and metallic (metallic bond). Among the pigments are crystals of all types of contact, but not always strictly enough to bind the crystal to one type or another.

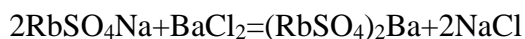
Through this classification of pigments, we can get to know the composition, structure, properties, properties of paint products obtained with their participation, as well as the inorganic and organic compounds present in them. First of all, let's get acquainted with the composition, structure, properties and nature of inorganic compounds in pigments. Inorganic pigments are made up of several types. In the case when the chemical elements present in their composition depend on the elements in the periodic table, the composition and properties of the dyes also change. Of the inorganic elements contained in the Pigment, we will consider the following.

The elements contained in inorganic pigments are first synthesized by separating them from compounds. In particular, inorganic pigment-aluminum hydroxide-is obtained on the basis of the following reaction.



It is possible to form a pigment with high dispersibility by changing the concentration, deposition reaction, mixing conditions, temperature, duration and other indicators of aluminum sulfate and soda. Important mineral pigments include titanium dioxide TiO₂ with white color, karakuya with black color - technical carbon (C), Red cinovar (HgS), dimensionless surik (ingredient a has 75-95% FeO₃) and yellow color (natural thermal hydroxide Fe(OH)₃ mixed with clay. As a Pigment, chromium, lead, cadmium, cobalt, copper, manganese, etc. compounds are also widely used.

Research results. Inorganic pigments also contain pigments that are used for varnishes. Lacquer pigments-acidic coloring agents are insoluble salts of two or three-valence metals or complex salts of some coloring substances. Lacquer pigments obtained from acidic tormentors are formed by precipitating them in water solutions of barium, calcium or strontium chlorides. Calcium lacquer pigments tend to be slightly more blue than barium pigments. Strontium varnish pigments are more resistant to light than barium and calcium pigments. The brand of varnish pigments will consist of two letters: the first letter indicates the color tone, for example, S-Sine (Blue), J-zheltohati (yellowish) , the second letter characterizes the precipitator: B-barium, K-calcium, etc. The extraction of acidic varnish pigments is expressed according to the following scheme:



Dark red lacquer pigment SK Crimson lacquer paint is obtained by precipitating "S" in a solution of calcium chloride. Acidic red lacquer coloring substance C, Crimson lacquer pigment SK, qipred varnish pigment SK, will have a blue-red (almost crimson) color, high transparency, good printing properties, but light resistance is limited. Scarlet triad is used in the preparation of dyes. Red lacquer pigment DB is one of the brightest yellowish-red pigments, but it is used only for interior decoration of publications due to its moderate light resistance. In cases where a high level of light resistance is imposed, a clear-red pigment is used. Lacquer pigments made from acidic agonizing substances, mainly red ones, differ in their bright dark color, good printing properties, high transparency, gloss on the copy, but their light resistance is average. Therefore, they can be used only when the element that adorns the inside of the print is printed, that is, when the light resistance of the print product is not required. Except for the dark red lacquer pigment SK, from which the production of the temporary, light - resistant number 4 dark red azopigment was established, triad B-collars are still used.

Discussion. In lacquer pigments made from base triferyl methane and xanthene coloring agents , the parachinoid chromophore group is precipitated with B'olib, heteropolycislotas, for example phosphorus-molybdenum-tungsten acids. Phosphorus is based on molybdenum-tungsten acid, since only four of the seven hydrogen atoms present in their molecule can exchange positions with other cations, being firmly linked in the complex of the other three atoms of hydrogen. Obtaining crystals from solutions is called crystallization.

The crystallization process includes:

- 1) formation of extremely saturated solutions;
- 2) the appearance of crystallization nuclei;
- 3) crystal growth;
- 4) recrystallization (dissolution and crystallization).

Crystallization involves two processes:

1) the growth of existing crystallization centers due to the deposition of new molecular layers;

2) the appearance of crystallization centers.

Depending on the direction of the coordinate axes and the ratio of the dimensions of the translations in which the unit cell is formed, all classes of symmetry, which are possible for crystal lattices, are divided into 6 systems, are called singonies: cubic, tetragonal, hexagonal, rhombic, monoclinic and triclinic (fig.

So, according to the type of centralization, the bars of the cubic system are centered on the face, the body is centered, the bars of hexagonal singonia – 12 times centralized (two nodes on a diagonal of a larger volume), the bars of rhombic singonia – centered on the body, the base is centralized, the face is centered, the bars of monoclinic singonia - the base is centered.

Conclusion. Pigments obtained on the basis of complex compounds are classified according to a certain order and rules. From this classification, it is studied how pigments are, in particular, inorganic composition. The classification explained what processes pigments are manifested based on different conditions and in compounds with different aggregate states. First of all, the elements contained in inorganic pigments are first synthesized by separating them from compounds. Then they are integrated. The resistance of the finished product to various conditions is checked. For example, we studied hardness, weldability, resistance to light and other influences.

REFERENCES

1. Ҳакимов У.Р. Органик химия. Т.: Ўқитувчи, 1988. 57-261 б.
2. Винеюкова Г. Н. Химия красителей. -М.: Химия, 1979. 34-366152-15 с
3. Иванов Ю. С., Никандров А. Б. Технология целлюлозы. Варочные растворы, варка и отбелка целлюлозы: учебно-практическое пособие/ СПбГТУРП. - СПб., 2014. - 41 с
4. Yusupov V.G., Toshev M.T., Parpiyev N.A., Koordinatsiyey birikmalar kimyosi, T., 1996;
5. Павлов Б.А., Терентьев А.П. Органик химия курси. -Т.: Ўқитувчи, 1965. 276- 489 б.
6. Abdugarimova Z.M., Namroyev A.L., Amiratoyev A. Tolali materiallarni pardozlash kimyoviy texnologiyasi. T.:Mexnat, 2004.79-125 b.
7. Sobirov Z. Organik kimyo. -T.: Aloqachi, 2005 y-270-332b.
8. Примухаммедов И.М.Органик химия. - Т.: Медицина, 1990. 183-384 б.
9. Искандаров С.И., Шоймардонов Р.А., Абдусаматов А.А. Органик химия.Ўзбекистон, 1979. 483-508 б.
10. Ёш химик энциклопедик луғати.-Т.: Шарқ нашриёти, 1986. 99 б.
11. Гурин Ф.Ф., Клапино Б.Д., Реин В.В. Химия синтетических красителей. -Л.: Химия, Том V, 1978. 215-223 с
12. Искандаров С.И., Шоймардонов Р.А., Абдусаматов А.А. Органик химия. -Т.: Ўзбекистон, 1979. 483-508 б.
13. Содиқов О.С., Йўлдошев О.Й., Султонов К.С. Органик химия. -Т.: Ўқитувчи, 1971. 645-588 б.
14. Венкатараман К. Химия синтетических красителей. -Л.: Химия, Том V, 1977. 123-141 с

15. Isayev Yu.T. Organik kimyodan ma'ruzalar matni. Andijon 2011.
16. Ахмедова Қ.С. Химия халқ хизматида-Т.: Ўзбекистон, 1979. 37-39 б.
17. Asqarov I.R., Isayev Yu.T., Mahsumov A.G., Qirg'izov Sh.M. Organik kimyo. –Т.: G.G'ulom, 2012, 252-254 b.
18. www.lakokraska-ya.ru
19. www.infrahim.ru/cat/lkm
20. www.kvil.ru
21. www.arshin-shop.ru/catalog/type/lakokrasochnie-materialy
22. www.uzli.info
23. www.prom-x.ru/lkm