Glauconite Containing Sands of Uzbekistan - Key Features and Prospects

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Abstract—Uzbekistan has huge reserves of raw materials including glauconite containing sands have an important economic value. Due to its unique properties, derived from the activated glauconite sands in the international practice is used in various sectors of the economy. Through intense and stable green coloration can be used as a pigment for the production of natural green facade paints [1]. According to [2], some species glauconite containing in its structure active potassium cations (7-8%), phosphorus (up to 3%) and trace elements (cobalt, manganese, iron, copper, etc.) can be used for producing potash as a natural fertilizer without processing. The authors of [3] recommends the use of glauconite as a sorbent material as environmentally friendly products in the areas contaminated by pesticides and radionuclides.

Keyword—Deposit, Glauconite, Sand, Structure, Composition

I. INTRODUCTION

As can be seen from the table, the most promising fields in terms of reserves and content of glauconite can be considered Changinskoe, Garm-Chashmasaysko, Kafrunskoe and Krantaukso field. In determining the prospects of these sands for the purpose of their use for a particular product should be considered as geological and economic factors that are important for the development of these fields.

In our studies in order to find a comprehensive source of raw materials for the vitreous, vitreous in particular, studied the basic characteristics of glauconite sands Karakalpakstan. The feedstock samples taken sandy-argillaceous material with medium and fine graininess. By sampling colors samples vary from light green to dark green. The main part of the sample has a homogeneous isotropic dispersed structure of cryptocrystalline masses.

II. COMPUTATIONAL METHODS

The Mineral Resources Institute (WRI), State Geology Committee of Uzbekistan The following studies were conducted: features accommodation, material composition of rocks, the definition of mineral and geochemical characteristics and other data glaukonisoderazhaschih Krantaukso sands deposits, the results of the definitions of some indicators are given in Tables 2 and 3.

According to the authors of [5], glauconite, which belongs to the group of hydrous comprises alumina silicate and aqueous iron 2-15% K2O, and zeolitic water.

Table 1: Containing known deposits of glauconite sands of the Republic of Uzbekistan.

<table>
<thead>
<tr>
<th>№</th>
<th>Name geological area</th>
<th>The name fields</th>
<th>Hypothetical reserves</th>
<th>The content glauconite mass.%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pritashkentsky</td>
<td>Changi</td>
<td>14 million tonnes</td>
<td>13-16</td>
</tr>
<tr>
<td>2</td>
<td>Pritashkentsky</td>
<td>Garm-Chashma site</td>
<td>10 million tonnes</td>
<td>10-15</td>
</tr>
<tr>
<td>3</td>
<td>Pritashkentsky</td>
<td>Bulgarians</td>
<td>1,5 million tonnes</td>
<td>10-16</td>
</tr>
<tr>
<td>4</td>
<td>Hissar</td>
<td>Cameroon</td>
<td>15 million tonnes</td>
<td>6-12</td>
</tr>
<tr>
<td>5</td>
<td>Hissar</td>
<td>Tagarasay</td>
<td>Not regulated</td>
<td>8-24</td>
</tr>
<tr>
<td>6</td>
<td>Sultan Uwais</td>
<td>Hujakul</td>
<td>8-10 million tonnes</td>
<td>10-14</td>
</tr>
<tr>
<td>7</td>
<td>Sultan Uwais</td>
<td>Krantau</td>
<td>10 million tonnes</td>
<td>10-20</td>
</tr>
<tr>
<td>8</td>
<td>Sultan Uwais</td>
<td>Kyzylidar</td>
<td>Not regulated</td>
<td>15-18</td>
</tr>
</tbody>
</table>

Table 2. The chemical composition of glauconite sands deposits Krantaukso

<table>
<thead>
<tr>
<th>Manifestation field</th>
<th>Content glauconite wt.%</th>
<th>Chemical composition (wt.%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SiO₂</td>
<td>Al₂O₃</td>
</tr>
<tr>
<td>Krantau</td>
<td>50,0</td>
<td>59,08</td>
</tr>
</tbody>
</table>

Spent mineralogical analysis shows that the composition containing glauconite sands contained the following minerals: glaukonit- 50% quartz, 20-40%, 10-15% montmorillonit-, feldspars to 5%,slyuda- to 2%, up to 10% other.

III. COMPUTATIONAL RESULTS AND DISCUSSION

We have to study the processes that occur during heating glauconite rocks, as well as identify possible codification phase changes DTA method was used. DTA carried out on derivatograph Q-1500D in the system F. Paulik, Paulik W., L.Erdey. The heating rate was 20 K / min. Explanation thermogram performed based on the data presented in [6]. On derivatograms (in DTA curve) revealed typical for this mineral are two main endothermic and exothermic effect of...
three. The first endothermic effect at -1170S probably associated with the release of the adsorption and interlayer molecular water, three exothermic effect appearing at 3740S, 3860S, 4560S, formed, probably in connection with the transition of Fe2+ to Fe3+. The appearance of the endothermic effect at -7610S is apparently due to the release of the second portion of water associated with the formation of hematite and hydroxyls.

Figure 1: Detail of DTA curves of glauconite and glauconite sand - original, 2 - glauconite [5].

According to X-ray diffraction analysis revealed that the composition of the feedstock present glauconite minerals, montmorillonite, quartz, feldspar.

Data for the study of particle size distribution of a number of deposits of sand glauconite given in Table 3.

Table 3: Grain size distribution of glauconite deposits Karakalpakstan

<table>
<thead>
<tr>
<th>№</th>
<th>Classes size, mm</th>
<th>Mass fraction of class fields,%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Krantaukske</td>
</tr>
<tr>
<td>1</td>
<td>+0,59</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>0,59...+0,42</td>
<td>0,4</td>
</tr>
<tr>
<td>3</td>
<td>0,42...+0,21</td>
<td>14,8</td>
</tr>
<tr>
<td>4</td>
<td>0,21...+0,15</td>
<td>46,2</td>
</tr>
<tr>
<td>5</td>
<td>0,15...+0,07</td>
<td>37,1</td>
</tr>
<tr>
<td>6</td>
<td>-0,07</td>
<td>1,5</td>
</tr>
</tbody>
</table>

It follows from Table 3 that the samples and Krantausko Hodzhakulskogo Hodzhakulskogo field glauconite grains dominate class ... + 0,21 0,15 mm, and the sample field dominated Kyzylzhahskogo minimum grain size glauconite ... + 0,07 - 0,15 mm.

Interest in this raw material arose out of its chemical composition. As can be seen from Table. 2, in its composition, there are all the necessary components to get its vitreous. Unlike glass, vitreous enamels to formulations in terms of its transparency, are not subject to special requirements. Chemical analysis of the starting materials shows that the composition of glauconite sand contained increased amounts of iron oxides. According to the literature, [6] the adhesion strength in the system "metal-vitreous" is largely determined by the presence of an intermediate layer of FeO (wüstite), which is an important factor in the emergence of ferriferous phases. A Magnetite (Fe2O3) and hematite (Fe3O4) capable of dissolving the melt in the enamel, as stated above, can improve the strength properties of the enamel coating.

For stekloemalеyvih frits in our study was prepared by a number of compounds, consisting of the following components: quartz sand glauconite (wt%) 40,0-60,0; boric acid, 5,0-20,0; Soda 18,0 ÷ 22,0; aluminia-waste Shurtan Gas Chemical Complex 2,0 ÷ 20.

As traditional stekloemalеyvih steklomatritsa frit of the following composition were adopted [6]; SiO2 - 40,0%, B2O3 - 35,0%, Al2O3 - 6,0%, Na2O - 17,0%, CoO - 1,0%, NiO - 1,0%.

Melting korundizitovыh frit was carried out in a 500 ml crucible in a laboratory furnace with heaters sillitovymi. The cooking temperature 13500S; the heating rate of the charge to 1000C / hour to 8000S, the heating rate in the batch 900-10500S - 500S / hour. The holding time at the maximum temperature of 30 30 min. All glass compositions-cooked without any visible process deviations. The formulations with high content of alurnina-waste are refractory and short in the molding area. The resulting molten glass in the glass spheres by passing them in water draining.

CONCLUSION

The resulting molten glass has a dark green color with good luster. Thus, on the territory of Uzbekistan identified glauconite sands of different purposes. Modern methods of physical-chemical analysis to determine the chemical, mineralogical and particle size distribution of glauconite sand. Preliminary studies glauconite sand show the feasibility of its use as the main component for vitreous enamels.

References


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