APPLIED MINERALOGICAL STUDY ON THE HUDEŞTI QUARTZITIC SAND FOR GLASS INDUSTRY USES

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This study is aimed at establishing the chemical, granulometric, mineralogical and morphological specific features of the Hudeşti quartzitic sand from the view of its higher utilization in the glass industry. There were four samples analyzed: one consisting of raw sand and three sorts (pre-graded, S_0, and Special S_0).

The chemical analyses revealed that the SiO_2 content is about 94.12 % for the raw sand and it rises up to 97.40 % for the superior sorts (S_0 and Special S_0). It also came out that, among the other compounds, CaO had the highest content (2.70 % for the raw sand and approx. 1.40 % for the superior sorts).

Thus, it can be concluded that all the four samples have a very high SiO_2 content, and that the S_0 and the Special S_0 sorts have virtually identical compositions.

The grading analyses were performed through wet classification by using a vibrating installation. Their results show that the raw sand sample and the pre-graded sort have a greater ratio of material with sizes under 0.15 mm. Again, it is obvious that the S_0 and Special S_0 sorts are very similar.

Several analyses and determinations, such as separations in heavy liquids, magnetic grading, HCl treatments, and others were performed in order to establish the mineralogical composition, which showed that the main impurity was calcite (2.00–2.20 % in the superior sorts).

The mineralogical study pointed out two detrimental aspects:

1. Calcite occurs mainly as crusts on other grains' surface;
2. Quartz shows μm-sized inclusions, the most important of these being the metallic oxides that cannot be removed by mechanical preparation methods.

The morphoscopic analyses pointed out that the samples' sphericity is between very spherical and sub-sharpened, and their roundness is generally between sharp and very rounded. These characteristics indicate that the sand had a long evolution, with repeated shifts from sub-aquatic to sub-aerial environments, due to the vertical oscillations of the continental plateau.

The existence of the Fe, Ca, Ti and Zr inclusions in quartz was confirmed by electronic microprobe scanning. Iron is present both as concentrations in certain specific minerals and as molecular dissemination in the entire mass of the quartz grain.

In conclusion, the samples' iron content can be decreased by removing the free ferri-ferrous minerals, but, due to the inclusions and the dissemination found in the quartz grains, it cannot be totally taken out from the superior sand sorts.