Silica sand characterization and treatment of Ighil Ali deposit northeast region of Algeria

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Abstract

The increase of the requirements in products for advanced technologies is responsible of frequent demands for pure phase minerals [1,2]. In this context, some raw material for industries with significant added value must be pure enough in order to achieve the required technological and economic objectives.
In this work high purity silica sand from El-Oued region (NE Algeria) was studied as raw material for suitable high industrial applications (SiO_2 ($\geq$ 98%)) [3].
The Samples investigated by optical microscopy, X-ray fluorescence and Raman spectroscopy highlight the presence of many solid impurities. Thus, we can distinguish significant quantity of iron oxides and also different silicate phases such as epidote, garnet, pyroxene and amphibole (actinote). The analyzed silica shows well-developed crystals areas, delimited by microcrystalline regions. Impurities are predominantly associated with quartz with the particle size less than 250μm. The XRF results highlight an average rate of silica up to 97,5wt%,
However, these values remain insufficient for its direct use as raw sand for high industrial technologies. A preliminary enrichment using High Intensity Magnetic Separation (HIMS) improves the silica purity up to 98wt% and removes the major impurities, mainly iron oxides up to 0.5%, able to be use in the industry of flat glass. However, a complementary enrichment is needed for its use in optical and optoelectronic domains.

References

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