

BENEFICIATION OF SOME EGYPTIAN GLASS SANDS(*)

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The attrition-scrubbing of some Egyptian glass sands was necessary for the disintegration of the ferruginous clayey coating on quartz grains. The effects of time of attritioning, impeller speed and solid/liquid ratio were investigated. Classification of the scrubbed sands resulted in the removal of a slimy fraction and yielded a product having 0.065% Fe. Acid attritioning of sand with commercial HCl at room temperature did not affect the iron, coating quartz particles.

The application of tabling or magnetic separation methods to the classified sand was conducted to get rid of the free heavy minerals which are mainly magnetite, chromite, staurilite, epidote and some ilmenite. The considerable electric power consumption by either processes is not a serious drawback, because the High Dam Power Station would generate cheap electricity. A "Wilfley" shaking table was employed for this purpose to study the effects of the rate of feed, water flow rate, motor speed, stroke length and deck slope. At the optimum conditions, the table yielded a product having 0.047% Fe. Although further cleaning resulted in a final concentrate having 0.045% Fe, some free heavy particles could be seen by the binocular microscope. Thus it seems that although the concentration criterion is about 2, table cleaning of glass sands is not sharp and entrainment of fine heavy minerals still occurs.

On the other hand, magnetic separation had been found to be of considerable value for cleaning such non-metallic material. The application of the "Dings" cross-belt separator yielded a non-magnetic rougher concentrate assaying 0.029% Fe. This implies the attainment of a single particle layer on the main belt, as a rate of feed. A suitable formula comprising the speed of the belt and the size of the feed was postulated to fulfil this requirement. At the optimum conditions, a cleaner concentrate assaying 0.022% Fe was obtained. Although shielding of the coarser quartz grains to the finer heavy mineral particles actually occurs on the belt, magnetic separation was found to be superior than tabling in the production of cleaned sand which may be suitable for the production of some forms of glass.

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