Experiment on triboelectrostatic beneficiation of the mid-low grade phosphate ore in Jiangchuan

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Abstract: X-ray fluorescence spectrametry, X-ray diffraction analysis, optical microscopy and other analytical methods have been used to study the mineral components, texture and structure, and mineral embedded properties of phosphate ores in the Jiangchuan phosphate deposit. The results show that the phosphate rock contains 24.47% of P_2O_5, 27.21% of SiO_2, and 1.78% of MgO. It belongs to the mid-low grade silicon calcium phosphate ore, and apatite is the major valuable mineral and quartz is the major gangue mineral. On the basis of the above work, the raw phosphate ore was handled by triboelectrostatic beneficiation to recover the valuable components of the ore. The P_2O_5 mass fraction of 30.23%, the recovery rate of 72.36%, and the MgO/P_2O_5 value of 2.35% for the phosphorus concentrate can be obtained by the triboelectrostatic closed circuit test of one roughing and one selecting and one scanning under the conditions that 1% carbon powder is added for grinding aids, 92.90% ores are grinded to less than 0.147 mm in size, and the preheating temperature of the grinded ores is 110℃. This research has provided a new technical scheme for exploiting the mid-low grade phosphate ore in a high efficient and environment friendly way.

Keywords: mid-low grade phosphate ore; beneficiation; dielectricuty; triboelectrostatic beneficiation; suspension electrostatic separator