

Optimized Magnetic Separation for Efficient Recovery of V and Ti Enriched Concentrates from Vanadium–Titanium Magnetite Ore: Effect of Grinding and Magnetic Intensity

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We present an optimized magnetic separation process to improve the recovery of high-content vanadium and titanium concentrates from vanadium–titanium magnetite (VTM) ore. The ore chunks were crushed using jaw crushers and then grinded in a laboratory rod mill for different grinding times and studied. Vanadium recovery was dependent on maximizing magnetite and ilmenite recovery. Ilmenite, which is the main source for titanium, existed in the stripes within magnetite; it got pulverized first during milling and remained as relatively coarse particles of magnetite. A grinding time of 15 min was determined as optimum for the grinding conditions of this study, based on the degree of liberation, the grade, and recovery of vanadium. The effect of varying magnetic intensities on the separation behavior of the pre-concentrates was analyzed through magnetic separation of the ground VTM samples. The grade and recovery attained for the vanadium concentrates were 1.12% and 63%, respectively. In addition to vanadium, titanium concentrates were also obtained by medium-intensity magnetic separation and the grade and recovery were 38% and 75%, respectively.