EQ06

Purification of Granular Quartz Using High Gradient Magnetic Separation

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In this paper we will present utilization high gradient magnetic separation method and superposed magnetic field gradient for iron losses from granular quartz. The separation method was using for the sulphur extract in ore coal [1,2,3]. The High Gradient Magnetic Separation method consists in passing through a ferromagnetic matrix of a biphasic fluid which contains dispersion of magnetic and nonmagnetic grains in mixture which have to be separated. In order to obtained high quality materials we have found that using high gradient magnetic separation method with a matrix in accordance with granulation of the quartz sand the content of iron may be diminished. The installation consists in: an electromagnet, coil and polar pieces. Divided matrix contains ferromagnetic wire and is in an alternative movement so that allow retaining magnetic and soft magnetic particle on the wire will be washed out of the air gap of the electromagnet. Experimental dates are based on difference between magnetic properties of the quartz which is diamagnetic and that of the associate impurities which are paramagnetic, ferromagnetic or ferromagnetic and contain iron. The installation used for experimental measurements had between polar pieces in central region a middle value of the magnetic induction B = 0,5T and of the magnetic gradient $|\nabla H|$ = 4 T/m. The magnetic wool positioned in this region near magnetic wire Bw = 0,8T and an high gradient of the magnetic field $|\nabla H|_w$ = $2 \cdot 10^4$T/m, sufficiently to obtain a very good collection of the magnetic or magnetisable particles from are of quartz on the magnetic wires of magnetic wool. The experiments have been made using are of quartz sand having different class of granulometry and different content of SiO_2 and Fe_2O_3. These samples were used in the process of iron purification from granular quartz by using high gradient magnetic separation and superposed magnetic field gradient for the dry and wet separation.

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EQ07

Effects of Cobalt Shell Thickness and Copper Core Diameter on the Magnetoimpedance of Electroplated Wires

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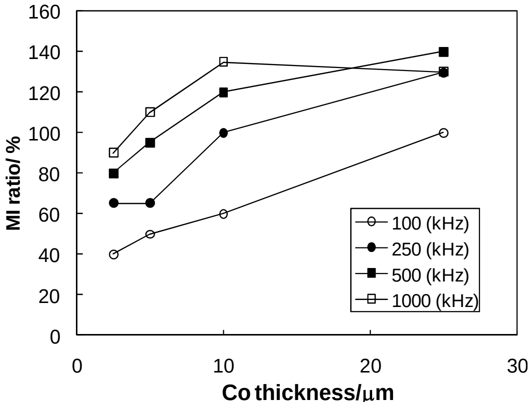
A variety of sensors can be prepared by electroplating ferromagnetic cobalt (Co) layers on conductive copper (Cu) wires because they exhibit magnetoimpedance (MI) effect. From this work, the Co deposition rate on 485 μm-diameter Cu increased with the bath pH but the quality of the coating deteriorated. The pH 2.5 was therefore selected for subsequent depositions of Co with a current density of 150 mA/cm^2. By measuring at four different frequencies (100, 250, 500, 1000 kHz) and Co thicknesses (2.5, 5.0, 10.0, 25.0 μm), the MI ratio of electroplated Co on Cu wires tended to increase with increasing Co thickness and frequency of the driving current. The magnetic layer also regulated the magnetic inductions and anisotropy regardless of the size of non-magnetic core. Nevertheless, the Cu core had a significant effect on the MI ratio. By comparing with the 47.7 μm-diameter Ag cores electroplated by Co of the same thickness [1], the Cu cores with a larger diameter gave rise to a larger MI ratio because their lower electrical resistance enhanced the crossing effect [2]. Substantial MI ratio was observed even in a low frequency regime because the skin effect occurred at a low frequency in the case of electroplated wires with large core diameters.



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