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NEW DISSERTATIONS

Behaviour of Solid Particles in Magnetic Fields. HGMS – Magnetic Separation/Filtration in Axial Configuration, V. Murariu, National Institute of Research & Development for Technical Physics, lasi, Romania, Ph.D. Thesis (1999), 149 pp, 106 refs. Supervisor: N. Rezlescu.

The dissertation describes a new axial-cell HGMS with bounded flow field designed to improve the efficiency of recovery. The cell is analysed both theoretically and experimentally. The theoretical model is based on the calculations of trajectories. The isotelic curves and transversal capture cross-sections were then deduced. The theoretical results are then compared with experimental data obtained with a cell designed in the laboratory.

In the second part of the thesis the buildup process on a single ferromagnetic wire is described and the limitations of the deposit by taking into account the magnetic force and an erosion force were analysed.

The final chapter of the thesis describes the influence of the concentration of the slurry on the efficiency of the cell with the bounded flow-field and on the accumulation process on a ferromagnetic wire.

Behaviour of Solid Particles in Magnetic Fields. HGMS – Magnetic Separation/Filtration in Longitudinal and Transversal Configurations, O. Rotariu, National Institute of Research & Development for Technical Physics, lasi, Romania Ph.D. Thesis (1999), 151 pp, 105 refs. Supervisor: N. Rezlescu.

The dissertation analyses theoretically and experimentally the process of magnetic capture of paramagnetic particles in longitudinal and transversal systems. In the case of the longitudinal configuration the selective capture of a ferromagnetic ordered matrix be analysed. The dynamic character of the capture process was observed.

In the case of the transversal configuration two different filtration systems with bounded flow field in which the ferromagnetic wires are placed outside of the slurry flow were analysed. It was found that filtration with the efficiency greater than 90% is possible, for a large range of magnetic susceptibility and volumetric fraction of paramagnetic particles.

Finally the possibility to apply the transversal configurations with bounded flow-field with to magnetodensimetric separation in magnetic fluids was described.

Evaluation and Design of Magnetic Fluid Separators for Density Separations, Mohamed Fofana, Department of Mineral Engineering, The Pennsylvania State University, University Park, PA, USA, Ph.D. Thesis (1997). 173 pp. Thesis advisor: M.S. Klima.

This thesis examined the density separation of coal using a magnetic fluid separator. The yield data were consistent with the separations obtained using other dense media such as organic liquids and zinc bromide solutions. However, the ash values were consistently higher at low relative densities for separations made in magnetic fluids. The differences were explained by particle misplacement resulting from a non-uniform effective density in the separation cell. This in turn was caused by the non-uniformity of the magnetic field gradient in the air gap.

The effect of magnet pole geometries on the magnetic field distribution was investigated using finite element simulations. An evaluation of the effect of various magnet shapes on the magnetic fluid effective density demonstrated that the non-uniformity in the effective density distribution within the separation volume could be greatly reduced.