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Conference Reports

INTERMAG CONFERENCE '93, STOCKHOLM APRIL 13 – 16, 1993

There seemed fewer delegates than usual at this annual springtime get–together of the World's magnetics community. The venue, The City Conference Centre, was quite well appointed. The main, banked lecture theatres were extremely comfortable, even soporific to a degree, while affording an excellent view of the podium and screen, good acoustics and even individual writing platform for each seat. The smaller lecture rooms were of the normal standard at Intermag. The conference exhibition seemed smaller than usual, there being only about a dozen exhibitors spread around various locations in the conference centre.

The conference reception was a triumph. Almost all delegates attended the event at the historical Stockholm City Hall and hosted by the City of Stockholm and the County Council. All in all, the conference turned out to be a pleasant and worthwhile week even if one was unfortunate enough to be frustrated by the few organizational gaffes.

The magnetic separation papers were presented in a poster session that was shared with magnetic fluids. Of the five promised works, only three were presented. The first two were concerned with electromagnetic separation and were:

"Electromagnetic separation: The prediction and measurements of conductor separability" by D. Fletcher and R. Gerber, University of Salford, UK. This work introduced the idea of a 'separability diagram' for a single boundary eddy–current separator. The diagram, the construction of which involves all the pertinent geometric, material and device parameters, allows the simple prediction of the possibility of any separation of one metal from another or from insulators and indicates the device parameter settings necessary. Experiments demonstrated correct predictions of device parameters for 100% recovery of Al, Cu and brass and for the onset of recovery for Al and Cu.

"Theory and experimental investigation of an improved field boundary model for a single boundary eddy–current separator" by D. Fletcher, R. Gerber and T. Reid, University of Salford, UK. This contribution showed experimental evidence that the previously used single–step model of the field profile of a single boundary eddy–current separator was good only in the median velocity range. A variance between experiment and theory at low and high velocities that lead to low and high penetration of the boundary was demonstrated. An alternative representation of the boundary by a 'staircase' field profile was proposed and the theory of element retardation in such a field was given. The fit of the new theory with experiment was shown to be much superior over the whole velocity range, allowing much more accurate and safer predictions of element behaviour in the separation zone and of the maximum input velocity and therefore throughput.

The third and last separation work presented was "The superconducting OGMS separator optimization" by T. Janowski and S. Kozak, Institute of Electrotechnics, Warsaw, Poland. The paper was concerned with the removal of industrial water pollutants and presented the results of an analysis of the effect of constructional parameters of A Helmholtz split pair OGMS separator on the separation efficiency.

Contours of constant efficiency (in m^3/h) for varying distance between the coils and coil length for 20 μm paramagnetic particles with medium velocity of 20 m/s and for 100 μm ferromagnetic particles for medium velocity of 2 m/s are shown. Also shown are plots of efficiency versus medium velocity for 100 μm paramagnetic particles and of efficiency versus first coil to magnet winding weight ratio. The conclusions are that the optimum geometrical parameters of the magnet depend on the size and type of particle to be filtered, giving, as an example, that a system designed for 100 μm ferromagnetic particles can achieve only 84% of what is possible, if it is used to filter 20 μm paramagnetic particles.

There was a poster session on hard permanent magnet application. M.G. Abele and H. Rusinek, New York University, USA presented a paper "Field distortion caused by magnetization tolerances of permanent magnets". This work deals with the distortion of the ideal field inside the cavity of powerful permanent magnets that are assembled from large numbers of small blocks of magnetic materials, such as rare earth alloys. The paper "New mechanisms of magnetization in permanent magnets" by R. Street, University of Western Australia was concerned with remanence–enhanced magnets. H.H. Stadelmaier, North Carolina State University ("Intermetallics for permanent magnets: current and future") reviewed historical features of permanent magnets and the growth of the energy product to today's 50 MGOe and then looked forward to the attainment of the 100 MGOe goal.

M. Sagawa and H. Nagota (Intermetallics Co., Kyoto, Japan) discussed the development of rubber isostatic pressing technology for sintered Nd–Fe–B magnets in their contribution "Novel processing technology for permanent magnets". The process is claimed to have the advantage of better magnetic properties, faster production, allowing more shapes and sizes to be produced, lower cost and faster delivery to the customer. The authors predict that combining RIP with reduced oxygen pick–up and better dispersion of the Nd–rich phase will lead to the industrial production of magnets with energy products higher than 50 MGOe.

H. Nagel (Nagel and Kronert Engineering GmbH) predicted in "Economic demands for future large–scale applications of permanent magnets" that a massive area of demand for permanent magnets could be the area of electric/hybrid car, if costs could be reduced by 50%. He then set about an engineering cost analysis of the production requirements to achieve such an aim for Nd–Fe–B magnets.

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