organic sulphur compounds will markedly increase this stress level.

It appears that previous determination of internal stress in rhodium deposits using a method relying on paints for stopping-off one side of the cathode must be suspect, and only an apparatus completely avoiding the use of paint can be used with confidence.

The contamination from Detel CRP paint has been shown to vary with temperature, becoming considerably greater at the higher temperatures tried. The Detel RHP paint, containing sulphur-free solvents, did not exhibit this effect.

The introduction of this new paint to the plating shop has improved operations on two counts; first, the stress cracking originating at the paint/plating interface is almost eliminated and secondly, the frequency of treatment of the solution with active carbon in order to remove organic contaminants is much reduced. Whereas with standard paints the plating solution was being treated after every ten days' operation, the interval has now been increased to as long as eight to ten weeks.

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References

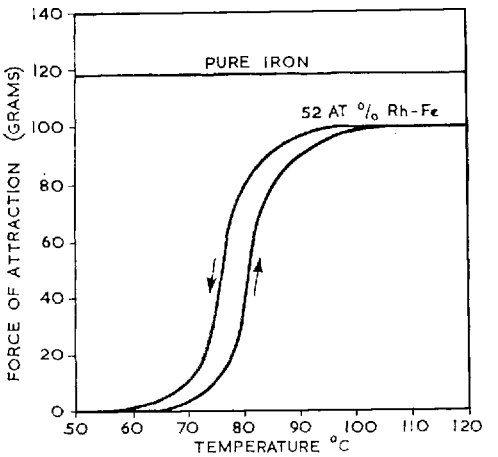
1 H. G. Soderburg and H. K. Graham, *Proc. Amer. Electroplaters' Soc.*, 1947, **34**, 74
2 T. P. Hoar and D. J. Arrowsmith, *Trans. Inst. Metal Finishing*, 1957, **34**, 354
3 A. Brenner and S. Senderoff, *Proc. 35th Ann. Conv. Amer. Electroplaters' Soc.*, 1948, 35–76
4 J. B. Kushner, *Plating*, 1954, **41**, No. 10, 1146
5 F. H. Reid, *Trans. Inst. Metal Finishing*, 1958–9, **36**, 74
6 F. H. Reid, *Metallurgical Rev.*, 1963, **8**, 175
7 H. J. Weisner and H. A. Meers, *Plating*, 1956, **43**, 347

Magnetic Transformation in Iron-Rhodium Alloys

SOME THERMAL SWITCHING POSSIBILITIES

The unusual magnetic properties of iron-rhodium alloys were demonstrated at the Johnson Matthey stand at the 1964 exhibition organised by the Institute of Physics and the Physical Society. Alloys containing approximately equal numbers of atoms of iron and rhodium are non-magnetic at room temperatures and become suddenly ferromagnetic when heated to about 70°C. The apparatus displayed comprised a small cylinder of 52 atomic per cent rhodium alloy suspended in a heating zone. On reaching the critical temperature, it was pulled downwards by a cobalt-platinum alloy magnet, which cooled the specimen until the antiferromagnetic state was attained; the test piece was then released upwards into the heating zone and the cycle repeated.

The curve illustrates the force exerted on an iron-rhodium armature, 0.64 cm in diameter and 2.5 cm long, hung vertically in a field tapering from 1000 to 200 oersteds along its length. The alloy had been previously ordered at 500°C for 20 hours. The force developed in the field became appreciable at 70°C and exceeded 90 g at 90°C. Over the same temperature range a geometrically



identical cylinder of pure iron was attracted uniformly with a force of 118 g. Although the non-uniform field has widened the transition temperature range, the results of this simple study provide a quantitative indication of the actuating forces which an elementary iron-rhodium thermal switch could exert and might possibly help to solve some thermal protection problems.

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