of the platinum cladding under stress. In one example of a platinum clad molybdenum stirrer, the cladding had burst and glass had run in. Metallographic examination of a transverse section cut from the platinum cladding showed a pale grey phase occurring as discrete particles and at the grain boundary, as shown in Fig. 7. Particles of glass were intimately mixed and embedded in the embrittled platinum so that it would have been impossible to eliminate all traces of glass from a sample for analysis by optical spectrograph. Since the glass contained arsenic oxide, arsenic would have been reported by this method of analysis. Arsenic certainly would embrittle platinum but a particle of glass containing arsenic (as oxide) by itself would not. The X-ray microanalyser was brought into action on the polished and etched section and by pin-point analysis the round metallic phase and grain boundary contaminant were identified *in situ* as arsenic. There was now no doubt that the arsenic revealed by this analysis was the contaminating phase in the platinum, and not the arsenic oxide present in the closely adjacent glass particles. Here again the local reduction of the oxide of arsenic present in the glass to arsenic by the molybdenum of the stirrer led to contamination of the platinum cladding after it had burst and allowed molten glass to come into contact with the molybdenum.

There are many other applications to which the electron probe microanalyser has been put. Diffusion studies of metal into glass, as well as metal into metal; identification of metallic inclusions in glass; variation in homogeneity in glass, and the variation in composition of extremely thin weathering bands in ancient glass, have been revealed. The technique of X-ray microanalysis in the fields of mineralogy and biology are being developed, but its outstanding usefulness in being able to analyse minute areas of the microstructure of metals as seen under the microscope is of immense value to the metallurgist.

References

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Novel Isotope Technique in Nitric Acid Plants

TRACING METAL LOSSES FROM PLATINUM ALLOY GAUZES

A significant factor in the economics of nitric acid production is the loss of rhodium-platinum from the gauzes employed in the ammonia oxidation converters. These losses are particularly important in high-pressure plants, where they may be more than ten times as high as in low or atmospheric pressure plants.

Karel Akerman and co-workers at the Institute of Nuclear Research, Warsaw, have described a series of experiments carried out in a nitric acid plant at Tarnow, Poland, aimed at tracing the whereabouts of the platinum alloy lost in operation (*Przemysl Chemiczny*, 1964, 43/6, 306). A platinum gauze containing 2 per cent iridium was neutron activated in a reactor until it contained an activity of approximately 280 mC resulting from the formation of Ir^{192}. This isotope has a half-life of 74.4 days and proved much more suitable for the experiments than the shorter lived isotopes Ir^{194} and Pt^{197} that are also formed. The latter were eliminated from the irradiated gauze by storing it for two weeks before use.

The activated gauze was placed with other rhodium-platinum gauzes in the converter, and the plant operated for thirty-eight days. Activated platinum alloy that had been lost from the gauze was traced throughout the plant with a scintillation counter and the various dust deposits located. It was found that the rate of loss was highest shortly after start-up of the plant and that a good estimate of the dust filter efficiency could be obtained.

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