



In the Graviner fire extinguishing equipment used in jet aircraft a platinum bursting disc is fitted at the three-way junction to relieve internal pressure due to inadvertent overheating

carried out using a soft metal plug in the side of the vessel. This was designed to melt if the vessel temperature rose above a dangerous level, but unfortunately the time lag between heat transfer to the plug and the build-up of internal pressure was too great and the vessels burst before the plug had time to melt.

Platinum was found to have complete resistance to seepage of fluid, and its corrosion resistance was excellent. The bursting pressure can be accurately predicted and a life of over five years can be expected.

References

- 1 G. F. Lake and N. P. Inglis, *Proc. Inst. Mech. Eng.*, 1939, **142**, 265-375
- 2 E. A. K. Patrick, *Trans. Inst. Chem. Eng.*, 1953, **31**, 114-119

Rhodium as a Polymerisation Catalyst

PREPARATION OF POLYBUTADIENE

In the production of synthetic rubbers from polymers and co-polymers of a series of dienes, notably butadiene, the properties and utility of the resulting polymer depend to a very great extent on the conditions of polymerisation and on the nature of the catalyst employed. Diene polymers and co-polymers are mixtures of 1,2 and 1,4 additions – each in the *cis*- and *trans*- form. Different methods of polymerisation cause certain structures to predominate and yield polymers of widely differing properties.

The stereo-specific activity of trivalent rhodium when used as a catalyst in the emulsion-polymerisation of 1,4 butadiene has recently been reported by R. E. Rinehart, H. P. Smith, H. S. Witt and H. Romeyn, of the United States Rubber Company (*J.A.C.S.* 1961, **83**, (23), 4864-4865). The chloride, nitrate and some other salts of trivalent rhodium were employed in dilute solution in

water or ethanol and yielded polymers containing more than 98 per cent of the *trans*-structure. This form of the polymer is hard, brittle and crystalline, compared with the usual rubbery material which consists largely of the *cis*- structure. The novelty of this finding lies in the fact that stereo-specific polymerisations of dienes had not previously been possible by the commonly-used emulsion polymerisation technique, as catalysts which could be employed are affected by water.

Applications of this technique for the production of *cis*-polybutadiene offers very interesting commercial possibilities. This type of rubber is said to have considerable advantages over natural and styrene-butadiene rubbers in the manufacture of heavy-duty tyres, in that it exhibits higher recovery rates from load strains and better resistance to undesirable temperature rises.

H. C.