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## Oxidation Behaviour of Some Platinum Alloys

For a limited number of specialised applications, such as for jewellery, the aesthetic appearance of a material is a crucial factor. Clearly the appearance must be pleasing at the time of purchase, and for precious metal items it is equally important that they should not lose their appeal with use or the passage of time.

Recently the results of a study sponsored by Rustenburg Platinum Mines Limited into the oxidation behaviour of a number of commercially available platinum-rich and 18 carat gold alloys has been reported (A. Wells and I. Le R. Strydom, *J. Mater. Sci., Lett.*, 1986, 5, (7), 743–746). The reactivity of the alloys was assessed by examining them in both the as-received condition and after heating at 150°C for 24 hours under a flow of oxygen.

After this treatment it was observed that both the gold alloys had undergone a colour

change, but no changes were perceived on the four platinum alloys, which contained 5 weight per cent cobalt, 10 and 15 palladium, and 7 palladium plus 3 cobalt.

Auger electron spectroscopy detected surface segregation of alloying elements on all samples, except for the alloy containing cobalt, an element for which the technique is insensitive. In general, the platinum alloys showed no significant changes as a result of the oxidation treatment, although minimal oxidation-enhanced copper enrichment was observed on the surface of the platinum-15 palladium alloy, in which a small amount of copper is incorporated.

From this study it was concluded that the platinum alloys examined were significantly less environmentally reactive than the two gold alloys, under oxidising conditions at near ambient temperatures.