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# Cathodic Modification with Platinum Metals

The use of the platinum group metals to modify the cathodic reaction on stainless steels, chromium-based alloys and titanium-based alloys has been under investigation for some considerable time. From the available research data which has been reviewed recently (A. Higginson, "Passivation of Cathodically Modified Alloys", *Br. Corros. J.*, 1989, **24**, (4), 297–302) platinum and the other five platinum group metals would seem to be obvious choices for improving the high temperature passivation characteristics of these materials when subjected to non-oxidising acidic media. What has limited the application of the results of these investigations is the level of noble metal addition required to achieve the benefits observed, and which consequently limits commercial viability. As pointed out by Higginson, even at 0.2 weight per cent, this addition can constitute the major cost of the cathodically modified alloy.

The benefit of achieving rapid and sustained passivity in chromium-, titanium- and iron-based alloys by the use of the platinum group metals does, however, warrant re-examination; in particular a study of the synergistic effects between the platinum group metals and elements such as molybdenum and nickel should be pursued. Higginson points out these areas for further investigation, and in addition highlights the generally poor performance of cathodically modified alloys in chloride-containing environments.

Finally, with respect to platinum group metal modified austenitic stainless steels in chloride-containing environments, it is worth mentioning the work of H. E. Hänninen, *Int. Met. Rev.*, 1979, (3), and G. Chaudron, U.S./Euratom Programme, Project No. 293, Eurac Reports 1749 and 1804. Findings from their research would indicate that although some marginal improvement in the general corrosion resistance of austenitic steels can be achieved by the addition of noble metals, an increase in the sensitivity to stress corrosion cracking may be expected, and to a degree which could make this class of material an unlikely proposition for noble metal alloy modification. I.R.M.

## A Stimulating Electrode

An electrical prosthesis may be used to artificially restore some function of the body which has been lost due to accident or disease. A review of the role of the platinum metals in this important biomedical application has been published here previously (P. E. K. Donaldson, *Platinum Metals Rev.*, 1987, **31**, (1), 2–7).

Now a paper from the University of Michigan describes a process for producing passive multi-electrode stimulating probes for use in neutral prostheses, based on a planar iridium oxide film (S. J. Tanghe, K. Najafi and K. D. Wise, *Sens. Actuators B*, 1990, **B1**, 464–467). Activated iridium oxide stimulating sites are shown to be capable of delivering very high charge densities to the tissue on a chronic basis.