base metal catalysts. There are, however, several applications where platinum group metals are at a potential advantage over base metals. These include lean-running natural gas-fuelled engines, where both exhaust temperatures and sulphur levels are generally low, and nitric acid plant tail gas treatment, where there is an advantage in operating at low temperature and where sulphur is not a problem. In the latter case, the main market lies in fitting SCR units to existing acid plants, since the current trend is to larger plants with extended absorption of nitrogen oxides. However, stationary engines represent a much larger market, given their use in gas pumping, heat pumps, and combined heat and power systems. Furthermore, legislation to limit nitrogen oxides emissions from this source is expected to become widespread in the future. It is anticipated that superior catalysts will be developed to meet the generally agreed need for a much cleaner, healthier environment in a more cost effective manner. The base metals currently used as catalysts for the SCR process, particularly for controlling emissions from stationary engines, are likely to be promoted with platinum group metals to achieve optimum performance over the widest possible range of feedstream conditions.

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The Behaviour of Platinum-Enriched Superalloys

The continuing development of the gas turbine engine results in an associated demand for improved materials from which critical components can be fabricated. These materials must be capable of providing not only the necessary creep strength at elevated temperatures but also adequate resistance to cyclic oxidation and hot corrosion.

With conventional superalloys, compositional changes made to improve the mechanical properties may result in inferior resistance to high temperature oxidation and corrosion. However, enhanced resistance can be obtained by enriching nickel based superalloys with platinum. An examination of the microstructures that form when platinum is added to superalloys has been conducted by Dr. G. J. Tatlock and T. J. Hurd, of the University of Liverpool who have compared, in their oxidised and hot corroded forms a conventional superalloy with another which had 4.5 per cent of platinum substituted for some of the nickel. The results of their oxidation investigations have now been published (*Oxid. Met.*, 1984, **22**, (5/6), 201–226).

Morphological studies confirm that the two alloys behave in a very similar way at 900°C, but that at 1100°C notable differences occur. At the higher temperature platinum appears to have a small but significant effect on the diffusion of the other elements present in the alloy. By a complex sequence of events, this results in the formation of a protective alumina scale which provides the platinum-containing alloy with a distinct improvement in oxidation resistance.