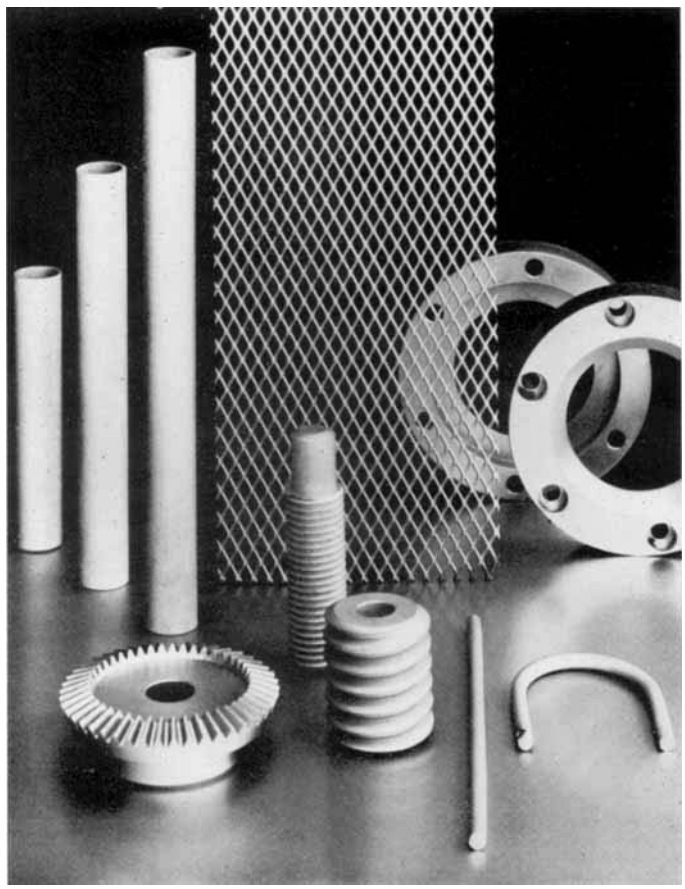
Heavy Platinum Plating from a Molten Salt Bath

The electroplating of platinum from conventional aqueous electrolytes is readily achieved on to a number of basis metals but, as with other coatings, is extremely difficult on to refractory metals owing to the presence of oxide layers. Some success has been achieved with metals such as titanium but the maximum thickness of deposit has usually been of the order of 2.5 microns and a complicated sequence of pre-treatment operations has been necessary.

A molten salt electrolytic process has now been developed in the Metals Research Department of Degussa at Wolfgang near Frankfurt for the deposition of highly adherent and ductile coatings of platinum on to a range of refractory metals such as titanium, tantalum, niobium, molybdenum, and tungsten, and even on to graphite.

The process uses a bath of molten cyanides, operating at a temperature of around 550°C, and thicknesses of 100 or 150 microns can be achieved. High tensile and shear strength values have been determined on these deposits, ranging from four to eight times the values obtained with normal electrodeposits, together with high ductility, with fracture occurring under test in the basis metal rather than at the interface.

The process offers the possibility of obtaining the desirable electrochemical properties of platinum on refractory metals in such applications as anodes for cathodic protection, for chlorine production, for the purification of toxic waste water, and for insoluble anodes in electroplating baths.



Examples of the applications of platinum deposition from the Degussa molten salt electrolytic process, including expanded metal anodes, tubes, rods, and finished components. The rod in the lower right hand corner of the illustration was bent over a radius of 20 mm after deposition without failure