the basic physical assumptions regarding the mechanism of the erosion of metal electrodes by electrical discharges. This mechanism, in cases which exclude chemical activity, corrosion and sputtering, envisages actual boiling of metal at the electrode hot spots by the energy available in excess of that dissipated by radiation and thermal conduction from the hot spot. Further, the agreement between theoretically predicted and experimentally observed erosion rates may also be regarded as evidence in support of the analysis of the different types of electrical discharges given above in the section or electrode processes.

From these conclusions, then, it follows that the dependence of the discharge erosion rate of the electrode on its physical properties is mainly on the lines indicated by the relation (1), and so substantiates the general observations given in the section on the erosion equation. This is of particular interest as far as the platinum metals are concerned, and it supplies the physical basis of the observed low erosion rates of metals of the platinum group: this also explains the low erosion rates of metals like tungsten and molybdenum in chemically inactive ambient atmospheres. These experimental applications of the erosion equation, therefore, help to form the basis of a fuller understanding, not only of the behaviour of platinum and of other metals, but also of the erosion process itself due to electrical discharges.

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Electro-organic Synthesis at Controlled Potentials

MERCURY CATHODE AND PLATINUM GAUZE ANODE

Although catalytic hydrogenation and other chemical reduction processes are employed in the synthesis of many organic chemicals, their application is sometimes limited by lack of selectivity. An alternative method of reducing organic compounds—controlled potential electrolysis—has been investigated recently by W. H. Harwood, of Continental Oil Company, and R. M. Hurd and W. H. Jordan, of Tracor Inc., using nitrobenzene as the starting material (*Ind. Eng. Chem., Process Design & Development*, 1963, **2**, (1), 72–77).

Electrolyses were carried out over the potential range —0.4 to —0.9 volt in sulphuric acid solutions, in a cell with a platinum gauze anode, a mercury pool cathode and a saturated calomel reference electrode. A high current capacity potentiostat, developed recently, maintained potential control. The various proportions of *p*-aminophenol, aniline, azoxybenzene and *p*-phenetidine produced were dependent on the electrolysis time and on the potential used.

The results of this laboratory-scale investigation indicate that potential control is effective in directing the course of electrochemical reduction reactions and in producing higher yields of some reduction products than are obtainable with chemical reducing agents. On an industrial scale, this technique may have many applications in the manufacture of organic compounds.