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Oxygen Reduction on Polycrystalline Pt Electrode Modified by Acetonitrile in Neutral Electrolyte

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Oxygen reduction was studied on pure polycrystalline Pt electrode and on one modified by chemisorbed acetonitrile in neutral solutions containing sulphate or chloride anions. Measurements were performed on polycrystalline Pt rotating disc electrode by a potentiodynamic sweep method.

The characteristic peaks of the hydrogen adsorption and desorption were not observed when the supporting electrolyte contained acetonitrile. Acetonitrile is reductively chemisorbed on Pt at potentials within the "double–layer" potential region. It can be supposed that when the supporting electrolyte contained acetonitrile, the adsorption of acetonitrile occurs and inhibit H adsorption on the Pt surface.

With increasing anodic potential limit, oxygen reduction takes place on the negative going scan starting from the potential of 0.20 V (*vs.* an Ag/AgCl reference electrode). For an anodic potential limit of 1.0 V, a maximum current for oxygen reduction wave was achieved at the potential of –0.20 V. Oxygen reduction is more pronounced for higher positive potential limits due to the higher coverage of Pt surface with adsorbed OH as a catalyst for oxygen reduction since the oxidation of polycrystalline Pt is supressed by the adsorption of acetonitrile. Results were compared to those for pure polycrystalline Pt electrode in the same electrolytes without acetonitrile.