

Oxygen Reduction on Au(100)-like Polycrystalline Gold Electrode in Alkaline Solution

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Catalytic properties of polycrystalline gold, Au(poly), were examined for the oxygen reduction reaction in alkaline solution using the rotating disc electrode technique. On electrochemically prepared Au(poly), oxygen reduction proceeds partly through 4e-reaction pathway resembling the activity of bare Au(100) in alkaline solution. Electrochemical behavior of such Au(100)-like polycrystalline gold electrode was compared with bare Au(100) surface, as well as with stepped Au(210)=Au[2(100)x(110)] and Au(533)=Au[4(111)x(100)] surfaces. It is shown that polycrystalline gold electrode behaved in a similar manner as stepped Au[n(111)x(100)] surfaces, meaning that the enrichment in (111)x(100) steps, rather than in (100) orientation is responsible for a partial 4e-reaction pathway in alkaline solution.

Keywords: Au(poly), Au(100), AFM, RDE, oxygen reduction, alkaline solution

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