Oxygen Reduction on Glassy Carbon-Supported PdAu Nanoparticles in Perchloric Acid Solution

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PdAu/GC nanoparticles obtained by the electrochemical deposition of gold followed by the spontaneous palladium deposition show a remarkable catalytic activity for the oxygen reduction reaction (ORR) in perchloric acid solution. AFM images reveal the size, shape, and coverage of the GC electrode with Au and PdAu nanoislands. Au/GC electrode with the full GC coverage by the deposited gold islands and activated by potential cycling shows the highest ORR activity. The initial potential for ORR shifts positively for 200 mV compared to polycrystalline gold. With the addition of palladium, the activity for ORR enhances significantly. For the most active PdAu/GC electrode, the initial potential shifts positively for another 250 mV, which coincides with polycrystalline palladium.

Keywords: Gold, palladium, glassy carbon, oxygen reduction, acid solution

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