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# Electrocatalytic Oxidation of D-Glucose Using a Cd ad-atom-Modified Au(111) Electrode in Alkaline Solution

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**Abstract:** Au(111) single crystal electrodes were modified by underpotential deposition (UPD) of Cd ad-atoms with different coverages, which were used for the electrocatalytic oxidation of glucose in alkaline media. The catalytic activity of the electrodes was dependent on how the Cd ad-atoms covered the surface. Under the presented experimental conditions the monolayer (ML) Cd ad-atom-covered Au(111) electrode had the best catalytic activity on D-glucose oxidation, in terms of both potential shifts and peak current increases, as compared to the 0.11, 0.5, and 2 ML covered and bare Au(111) electrodes. Double layer capacity measurements revealed that the shifts of the potential of zero charge (pzc) were dependent on the different surface coverages of the Cd ad-atom-modified Au(111) electrodes, which is in good agreement with cyclic voltammetric results, as the current flow was initiated for glucose oxidation after a slightly more positive potential of pzc in all Cd ad-atom-modified Au(111) and bare Au(111) electrodes.

**Key Words:** Cadmium, UPD, D-glucose fuel cells, double layer capacity, single crystal gold electrode

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