

# Electroanalysis

## Electroformation of Pd-modified thin film electrocatalysts using E-ALD technique

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### Abstract

Electrochemical atomic layer deposition was used to form bimetallic (BiPd, CuPd) and trimetallic (CuBiPd) thin films via surface-confined reactions. Pd thin films were characterized by cyclic voltammetry, scanning electron microscopy (SEM) and the alloy formation with preferred Au/Pd(111) orientation was confirmed by XRD. AFM revealed uniform grain distribution, with 3D islands growing on CuBiPd. EDX verified the presence of all deposited elements. Compared to other prepared catalysts, CuBiPd catalyst showed higher activity and stability towards the ethanol oxidation reaction (EOR), as confirmed by the peak current and onset potential trends, respectively: CuBiPd (1.35 mA, -0.450 V) > CuPd (0.6016 mA, -0.442 V) > BiPd (0.275 mA, -0.384 V) > Pd (0.186 mA, -0.350 V). The EOR current on CuBiPd improved by 2.5 folds relative to Pd. The results show that CuBiPd electrocatalyst is a promising material for EOR with enhanced catalytic properties for direct ethanol fuel cell.