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Underpotential deposition of Nickel on platinum single crystal electrodes.

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Abstract:

The initial stages of nickel electrodeposition on platinum single crystal electrodes have been investigated using cyclic voltammetry and CO charge displacement. While at pH=1, nickel deposition is not visible in the voltammogram, regardless of the crystal orientation, at buffered solutions with pH>3, nickel presence in solution produces clear voltammetric peaks around 0.35 V RHE on Pt(111) and Pt(110). Conversely, no clear voltammetric peaks are observed at any of the studied pHs on Pt(100). CO charge displacement experiments suggest that deposited nickel is in the form of a nickel hydroxide. Coulometric analysis is used to deduce the stoichiometry of the deposited adlayer. Moreover, the effect of nickel presence on CO oxidation have been investigated and the CO adlayer characterised using FTIR reflection absorption spectroscopy.

Keywords: Nickel deposition, platinum single crystal, FTIR spectroscopy, cyclic voltammetry, carbon monoxide, charge displacement

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