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O₂ electrochemistry on Pt: A unified multi-step model for oxygen reduction and oxide growth

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Abstract

Oxygen electrochemistry on platinum comprises of three well-known, phenomena - oxygen reduction reaction (ORR), platinum oxide cyclic voltammetry (CV) and platinum oxide growth. Many of the elementary reaction steps are common to the three reaction systems but usually separate kinetic models for the three phenomena are reported in the literature. In this paper, we present a single reaction framework comprising multistep mechanism, based on suitable modification of double trap kinetic model¹, that captures the key characteristics of the ORR, CV and oxide growth. Comparison between experimental data and model as well as other models is presented in this work.

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