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Abstract

New Insights and unexpected performance of Rh-Pt Electrocatalysts with Low Pt Content for Ethanol Oxidation Reaction

Nelson Alexandre Galiote^a, Vinicius Del Colle^{a,b}, Christoph J. Bondü^c, Marc T. M. Koper^c,
Germano Tremiliosi Filho^a

^a *São Carlos Institute of Chemistry, São Paulo University of São Paulo, P.O. Box 780, 13560-970 – São Carlos (SP), Brazil.*

^b *Chemistry Departement, Federal University of Alagoas – Arapiraca Campus, Av. Manoel Severino Barbosa, Bom Sucesso, 57309-005 – Arapiraca (AL), Brazil.*

^c *Leiden Institute of Chemistry, Leiden University, P.O. Box 9502, 2300 RA Leiden, The Netherlands*

A new strategy to insert small amounts of active Pt atoms in an inactive Rh matrix, forming nanoalloys dispersed in high surface area carbon (Black Pearls® - BP) results in synergistic materials dotted with better activity to CO₂ selective formation and robustness toward the ethanol oxidation reaction (EOR) in acid media when compared to the pure Pt materials. The results are discussed based on crystal lattice parameter modifications in a way that points out the lattice strain and, consequently, the electronic modification into Pt sites resulted in differences such ethanol adsorption as ethoxide molecules and acetaldehyde as the most active reaction intermediate, collaborating with better long-term activity, and better CO₂ production than pure Pt. Therefore, these are key materials to develop and foster direct liquid alcohol fuel cell commercialization.