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PdO/Pd-CeO_2 Hollow Spheres with Fresh Pd Surface for Enhancing Formic Acid Oxidation

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Abstract: Palladium (Pd) is an excellent catalyst for the electrochemical oxidation of formic acid. However, it is difficult for palladium to show true catalytic activity because its highly active surface is susceptible to oxidation and poisoning. Herein, we describe a facile strategy to prepare high activity PdO/Pd-CeO_2 hollow spheres with available fresh Pd surface from PdO-CeO_2 hollow spheres through an *in situ* electrochemical reduction process. Benefit from the fresh active surface, the PdO/Pd-CeO_2 hollow spheres catalyst exhibit an enhanced mass activity and durability for formic acid oxidation compared to the Pd-CeO_2 hollow spheres that are prepared by heat reduction. Moreover, the incorporated ceria can promote the oxidation of the intermediates adsorbed on the Pd surface through its facile adsorption of reactive oxygen species, resulting in an improved resistance to poisoning for the PdO/Pd-CeO_2 hollow spheres in an acidic medium.