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In Situ XAFS studies of the oxygen reduction reaction on carbon supported Pt and PtNi(1:1) catalysts[1] QINGYING JIA, EMILY LEWIS, COREY GRICE, EUGENE SMOTKIN, CARLO SEGRE, BCPS DEPARTMENT & CSRRI, ILLINOIS INSTITUTE OF TECHNOLOGY TEAM, NORTHEASTERN UNIVERSITY CENTER FOR RENEWABLE ENERGY TECHNOLOGY (NUCRET) COLLABORATION, NUVANT SYSTEMS, INC. COLLABORATION
— We have conducted Pt L_3 and Ni K edge in situ XAFS measurements on carbon supported Pt and PtNi(1:1) nanoparticle catalysts under a wide range of operating potentials. We observe that in PtNi alloys the Pt-Pt bond distance is shorter and the distribution of Pt and Ni is non-uniform: Pt has a tendency to be found on the surface while Ni is mostly in the interior of the catalyst nanoparticles. In addition, while a change in oxidation of the pure Pt nanoparticles is clearly observed at different potentials, the Pt in the PtNi alloy remains nearly oxygen-free at all potentials but an accompanying oxidation change of Ni has been observed instead. This phenomenon suggests that the presence of Ni inhibits the coverage of oxygen adsorbate on Pt surface, resulting in more active sites on the Pt surface.

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