In the last years, several Platinum-based bimetallic alloys have been studied as possible substituents of pure Platinum catalysts in Proton Exchange Membrane Fuel Cells (PEMFCs) to strongly reduce production cost. In particular, PtNi alloy was found to be a promising alternative to pure Pt due to its very good mass activity1 and its competitive catalytic activity2. Despite these advantages, the acid-based environment in which catalyst has to operate, causes the dissolution of the less noble metal and the consequent degradation of the catalyst layer. In this picture, in situ Grazing Incidence Small Angle X-ray Scattering, combined with Electro-Chemical AFM and Inductively Coupled Plasma Mass Spectrometry, is used to investigate the real-time kinetics of the surface degradation of PtNi alloy during electrochemical cycling voltammetry. In order to simulate the real fuel cell operation conditions, four different upper potentials have been used. Obtained results, allowed to describe the asymmetric Ostwald ripening process in electrochemistry the first time, A further investigation dependant on catalyst composition have also added to better describe the degradation of the aforementioned catalyst and to reveal in depth the structural and compositional changes during fuel cell operation.

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References
