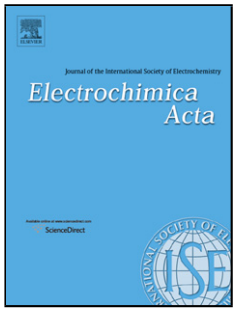

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Integration of Electrochemical and Synchrotron-based X-ray Techniques for *In-situ* Investigation of Aluminum Anodization

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Abstract

Anodization of aluminum alloys AA 6082 and AA 7075 was investigated *in-situ* with integrated electrochemical and synchrotron-based X-ray reflectivity (XRR) methods providing complementary information about the anodic processes taking place on the alloys. The stepwise potentiostatic polarization measurements reveal dynamic processes of the anodic oxide formation and dissolution, and the following electrochemical impedance spectroscopy measurements detect the break of the native oxide and the growth of typical two-layer anodic oxide film, while the XRR measurements show the growth of entire anodic oxide film whose thickness increases linearly with the increasing applied potential. The results indicate that while a stable anodic oxide can be formed on the both alloys with a similar growth factor, AA 7075 shows a thinner thickness of the barrier layer and a lower resistance of the oxide film. The electrochemical results