In situ structural study on underpotential deposition of Ag on Au(111) electrode using surface X-ray scattering technique

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In situ surface X-ray scattering (SXS) measurements were carried out to study the structure of a Ag layer on a Au(111) electrode formed by underpotential deposition (UPD) in sulfuric acid solution. Specular rod profiles showed that a monolayer of Ag was formed at a potential between the second and third UPD peaks, and a bilayer of Ag was formed at a potential between the third UPD peak and bulk deposition. Non-specular rod profiles demonstrated that electrochemically deposited Ag atoms both in the first and second layers were situated at the three-fold hollow cubic closest packing (ccp) site of the underlying Au and Ag layers, respectively.