

Study of the oxidation of iron films on Pt(111) by using X-ray Photoelectron Spectroscopy

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We have investigated the oxidation of iron thin films on Pt(111) surface by using X-ray photoelectron spectroscopy (XPS), and their chemical states were analyzed quantitatively. Upon an oxygen exposure of 300 Langmuir at 873K, the Fe layers are oxidized as a $\text{Fe}_3\text{O}_4(111)$. When the Fe films were exposed to the same amount of oxygen at room temperature, partial oxidation as FeO was observed for 9ML Fe film, while there was no oxidation for 6ML Fe film. On heating the 873K oxidized films, Fe_3O_4 was reduced to FeO, and even decomposition into Fe and chemisorbed oxygen was observed for 6ML Fe film. The underlying reasons of these chemical change will be discussed.