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铀表面状态的变角度XPS研究

@赖新春\$国家表面物理与化学重点实验室!四川绵阳621907 @伏晓国\$国家表面物理与化学重点实验室!四川绵阳621907 @李赣\$国家表面物理与化学重点实验室!四川绵阳621907 @钟永强\$国家表面物理与化学重点实验室!四川绵阳621907

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摘要 采用变角度XPS(X射线光电子谱)技术研究了贫铀的初期氧化过程,获取了金属态贫铀表面U4f和O1s谱峰以及价带的XPS谱。研究表明:变角度技术对金属铀表面初期的氧化过程揭示得更为详细,而且,金属铀表面外围电子只有离域态性质,未出现局域态,并对比文献中关于“U/基材”体系的实验结果进行了讨论。通过比较15°、45°和85°分析角度下O1s与U4f的XPS谱峰强度比值随时间的变化关系,观测到氧和铀的谱峰强度比值存在明显的差异,表明变角度技术可很好地应用于处于超高真空中的金属铀表面在初期氧化过程中的研究。

关键词 [铀](#) [变角度X射线光电子谱](#) [电子状态](#) [初期氧化](#)

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Angle Resolved X-Ray Photoelectron Spectra Study on Surface State of Uranium

LAI Xin-chun, FU Xiao-guo, LI Gan, ZHONG Yong-qiang (National Key Laboratory of Surface Physics and Chemistry, P.O. Box 718-35, Mi yangang 621907, China)

Abstract The angle resolved X-ray photoelectron spectra(ARXPS) were used to study the initial oxidation process. In the study, the U_4f, O_1s and valence band XPS peaks of depleted uranium were obtained. The results indicate that ARXPS technique can be used to study the initial oxidation process of metallic uranium in more details. In present study it is found that the valence electron of uranium surface exhibits just delocalized state, and no localized state. Discussions were given compared with the results from literatures about the system “U/substrate”. From comparison of the intensity ratio change with time of O_1s and U_4f XPS peaks acquired under 15°, 45° and 90° an apparent difference was observed, which shows that ARXPS is suited to study the initial oxidation process of uranium in the ultra high vacuum.

Key words [uranium](#) [angle resolved X-ray photoelectron spectra](#) [electron state](#) [initial oxidation](#)

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