

Interaction between RuO₂ and Carbon Nanotubes – Photoemission and X-ray Absorption Study

Seung Youb Lee¹, Yoo Seok Kim¹, Chelho Jeon¹, Kyuwook Ihm²,
Tai-Hee Kang², Chong-Yun Park^{1,*}

¹BK21 Physics Research Division & Department of energy science, Sungkyunkwan University, Suwon 440-746, Korea, ²Beamline Research Division, Pohang Accelerator Laboratory, POSTECH, Pohang 790-784, Korea

Since the carbon nanotubes (CNTs) have extraordinary material properties, many researchers are trying to make a practical application in various fields [1]. In particular, the high surface area of CNTs was fascinated for nano-template on the catalytic system. RuO₂ coated CNTs are useful functional nano-composites in many applications, including super capacitors, fuel cells, biosensors, and field emitters. However, the research of interaction between CNTs and RuO₂ was not satisfied with various fields [2]. In this study, we will introduce the change of chemical and electrical state of RuO₂/CNTs at different temperatures by synchrotron radiation photoemission spectroscopy (SRPES). The t-MWCNTs used in this experiment were grown on the Ni/TiN/Si substrates by chemical vapor deposition. RuO₂ of 4-20 nm in thickness was deposited on the t-MWNTs by sputter. The SRPES measurements were carried out at the 4B1 beamline of the Pohang Accelerator Laboratory in Korea. The result of XPS measurement indicates that the deposited RuO₂ on the CNTs was reduced into pure Ru at above 300°C. And we confirmed that the effective work function of RuO₂/CNTs was decreased with increasing temperature.

References

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