

TOF-SIMS Analysis of Nano-Materials: Recent Progress

Yong-Chien Ling, Bo-Jung Chen, Anil Vithal Ghule

(Department of Chemistry, National Tsing Hua University)

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With the growing knowledge and progress in nanotechnology, interest has been developed to integrate nanosciences into present and new emerging technology. It is also important to have efficient tools to cope up with the growing needs of characterization of complex systems involving nano-materials. Thus, scientists are in search of alternative tools or methods for their characterization of nano-materials. TOF-SIMS with its uniqueness and capability of providing information on atomic or molecular level while dealing with organic, inorganic, and organic-inorganic hybrid samples is justifying its role in nanotechnology.

This presentation is focused on demonstrating

the utility of TOF-SIMS in nano-material analysis. Method development and analysis of wide variety of samples like semiconductor nanomaterials, OLED, functionalized carbon nanotubes, quantum dots (QD) immobilized self-assembled monolayer systems, nanomaterial coated paper, cotton, and wool fibers, distribution of metal ions in biological samples etc would be discussed in detail. Depth profile and 3D imaging capabilities of ToF-SIMS are also explored to understand the distribution of the metal ions and nanoparticles in the samples. In our opinion, the critical role of TOF-SIMS in the new era of nanosciences is just appearing and its contribution is yet to be exploited.

References:

- [1] Ghule K, Ghule AV, Liu JY, Ling YC. Microscale size triangular gold prisms synthesized using Bengal gram beans (*Cicer arietinum* L.) extract and $\text{HAuCl}_4 \cdot 3\text{H}_2\text{O}$: A green biogenic approach, *Journal of Nanoscience and Nanotechnology*. Accepted.
- [2] Chen BJ, Lee PL, Chen WY, Mai FD, Ling YC, Hair Dye distribution in human hair by ToF SIMS, *APPLIED SURFACE SCIENCE*. 2006. in press.
- [3] Chen WY, Ling YC, Chen BJ, Wang CC, Atomic distribution in quantum dots - a ToF-SIMS study. *APPLIED SURFACE SCIENCE*. 2007. in press.
- [4] Ghule AV, Ghule K, Chen CY, Chen WY, Tzing SH, Chang H, Ling YC, In situ thermo-TOF-SIMS study of thermal decomposition of zinc acetate dehydrate, *JOURNAL OF MASS SPECTROMETRY* 2005, 39 (10): 1202-1208
- [5] Chen WY, Chen CY, Hsu KY, Wang CC, Ling YC, Reaction monitoring of polyaniline film formation on carbon nanotubes with TOF-SIMS, *APPLIED SURFACE SCIENCE* 2004, 231-2: 845-849

Corresponding Author: Dr. Yong Chien Ling, Department of Chemistry, National Tsing Hua University, Hsinchu, Taiwan 30013, ROC. Tel: 886-3-572-1484. E-mail: ycling@mx.nthu.edu.tw