

Standardization for Nano-technologies in an Era of Global Competition

S. Ichimura

Senior Vice-President

National Institute of Advanced Industrial Science and Technology (AIST)

E-mail address; s.ichimura@aist.go.jp

Abstract

Many economic leading countries including China has agreed to WTO (World Trade Organization) /TBT (Technical Barrier to Trade), so that they are requested to use international standards (ISO/IEC, etc.) when they want to develop mandatory standards and conformity assessment procedures. Thus standardization of industrial technologies, which is conducted by international organizations such as ISO, IEC, ITU, has increased its importance in an era of global competition. Japanese government has selected seven specific fields of international standardization in 2010, and is trying to accelerate activities not only in standardization but also in certification of industrial technologies/products. Such trend in international standardization will be introduced with typical examples.

Then the importance to extend the activities for new fields will be explained with specific focus on nanotechnology: In accordance with the acceleration of R&D for nanotechnologies, which is expected to be one of the most promising industrial technologies in the 21st century, standardization of measurement and characterization methods for nano-materials/structures has attracted much attention. The standardization is an important and urgent issue not only to support industrialization of nanotechnology, but also to offer sound technological base for investigation of social concerns that engineered nano-materials might have negative influence on human health and eco-system. ISO/TC 229 on Nanotechnology has started its activity in 2005, and it has 4 working groups (WGs) including WG2 for "Measurement and Characterization". TC229/WG2 focuses specially on the characterization of carbon nano-materials (mainly carbon nanotubes) as the first target¹⁾. In the presentation, the scope, structure, and outline of current work items will be introduced together with possible future discussion items based on the strategic plan of TC229/WG2. In addition to them, standardization of nanostructure-measurement using an AFM probe characterizer will be explained in detail as one of typical examples. Atomic force microscopy (AFM) is expected to be the most powerful measurement tool²⁾, although precise information of AFM probe shape is necessary for AFM measurement. The standard method, which is under discussion at TC201 (Surface Chemical Analysis)/ SC9 (Scanning Probe Microscopy), will provides contour (cross-sectional) profile of an AFM probe by line-profiling the surface of a new probe characterizer having a comb-shape structure with various pitch length (5 to 100 nm)³⁾. The merit and utility of a probe characterizer will be introduced.

References

- 1) S. Ichimura: J. Anal. and Bioanal. Chem. 396, 963-971 (2010)
- 2) S. Ichimura and H. Nonaka, Chapter 6 of "*Nanotechnology Standards (Nanostructure Science and Technology Series)*", Eds. Vladimir Murashov and John Howard, pp 117-163 (Springer, 2011)
- 3) C. Wang, H. Itoh, Y. Homma, J. Sun, J. Hu, D. Shen, and S. Ichimura, J. Nanosci. Nanotechnol., 9, 803-808, (2009).