NIST Issues First Nanoparticle Reference Materials for Biomedical Research

Supporting/Contributing Agencies: NIST, National Cancer Institute (NCI)

In January 2008 NIST issued the world's first reference material (RM) standards of nanoscale gold particles targeted for the biomedical research community. Promising biomedical research based on the use of nanoparticles to diagnose and treat disease has suffered from a lack of reliable nanoscale measurement standards, both to ensure consistency of data from one laboratory to the next and to verify the performance of measurement instruments and analytic techniques. To address this need, researchers from across NIST teamed with NCI researchers to produce three new RMs, gold spheres nominally 10, 30, and 60 nanometers in diameter. This accomplishment required the development of six different methods to measure nanoparticle size with unprecedented accuracy and precision at the nanometer scale. These RMs are a key standard needed for society to reap the benefits of nanomaterial-based approaches to cure diseases—such as revolutionary, minimally invasive cancer treatments that use nanoparticle "vehicles" to deliver drugs directly to a tumor. The RMs will also allow U.S. industry and Federal regulatory agencies to assess potentially hazardous risks of nanomaterial-containing products—such as cosmetics, food packaging, and wound dressings—to the health of humans, animals, and the environment, as well as to ensure safe processes for manufacturing nanomaterials.

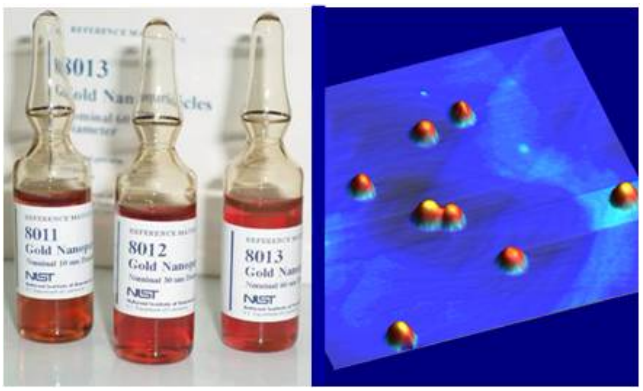

Figure 1. NIST gold RM units and an image of individual 60 nanometer gold particles.

References

NIST Report of Investigation for Reference Material 8011, Gold Nanoparticles, Nominal 10 Nanometer Diameter, 10 pp (2007), https://www-s.nist.gov/srmors/view_report.cfm?srm=8011. See also Reports of Investigation for 30 Nanometer Diameter Gold Nanoparticles (https://www-s.nist.gov/srmors/view_report.cfm?srm=8012) and 60 Nanometer Diameter Gold Nanoparticles (https://www-s.nist.gov/srmors/view_report.cfm?srm=8013).