

IUCr participation in the CODATA / VAMAS Working Group on Nanomaterials

Daniel Chateigner¹, John R Helliwell² and Reinhard Neder³

¹ CRISMAT-ENSICAEN Université de Caen Basse-Normandie, France

² School of Chemistry, University of Manchester, M13 9PL, UK

³Physics Dep., University Erlangen, Germany

Nanotechnology is moving rapidly towards commercialization, yet numerous scientific questions are unanswered. One of the most critical challenges is that there is no common nomenclature or description system for nanomaterials that is accepted by a single discipline, let alone by all disciplines. The scientific community is the one that can effectively address this challenge. IUCr was invited to participate in a CODATA / VAMAS Working Group in 2012. VAMAS is the Versailles Project on Advanced Materials and Standards (www.vamas.org). It is chaired by John Rumble on behalf of CODATA. The goal is to produce a White Paper meeting the needs of as many scientific disciplines and user communities as possible. This White Paper will be transmitted to ISO Technical Committee 229 on Nanotechnology as well as other international and national standards development bodies and government agencies. We can report that within this Working Group, Crystallographers do have a key role to help unambiguously define and characterize nanomaterials. Electron, neutron and X-ray scattering and diffraction, at small and wide angles, and imaging techniques offer a physically grounded determination of the coherent size domains (including crystal shape). Our tools can approach the physical state of nanoaggregates. Furthermore X-ray reflectivity is suitable when the nano character is only expressed along one direction (stacks, films). Compared to other fields of science, Crystallography appears as a potential leader of quantitative nanomaterial descriptors and definitions. We bring different perspectives to the task including the physical and biological sciences relevant to inorganic, organic and bio nanomaterials.