Measurements and Standards to Characterize More than Moore Applications of Electronics: Perspectives from IEC

Norbert Fabricius

Katlsruhe Institute of Technology, Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen, Germany

ABSTRACT

It is a common understanding that nanotechnology is one of the key technologies of the 21st century. Therefore governments and companies are investing an enormous amount of money in research and development to participate on the expected commercial success with nano-enabled products. Within the electrotechnical industry nanotechnology became important due to the miniaturizing of microelectronic devices driven by Moores Law. Typical structures have been reached dimensions well below 100 nm coming closer and closer to the physical and technical limit which is somewhere slightly below 20 nm. Nevertheless there are only a limited number of electrotechnical products in the market where the functionality of the product is based and inherently coupled to the use of nanomaterials and nanoprocesses. The lesson learned especially from the microelectronic industry is that standards play a critical role for the utilization of research results for commercial purposes. Therefore the International Electrotechnical Commission (IEC) has established the cross sectional technical committee IEC/TC 113 "Nanotechnology standardization for electrotechnical and electronic products and systems". Within the scope of this committee are the nanotechnology aspects within the broad range of technical areas where IEC is the responsible Standards Development Organization (SDO). IEC/TC 113 develops standards along the whole fabrication value adding chain and covers the complete life cycle of the product from fabrication to its end-of-life. Actually the main focus is on nanofabrication including standards on Key Control Characteristics (KCC), material specifications, nanomanufacturing processes and equipment as shown in figure 1. Examples of product groups addressed are nanoenabled batteries, photovoltaic cells, lightning devices and printed electronics.

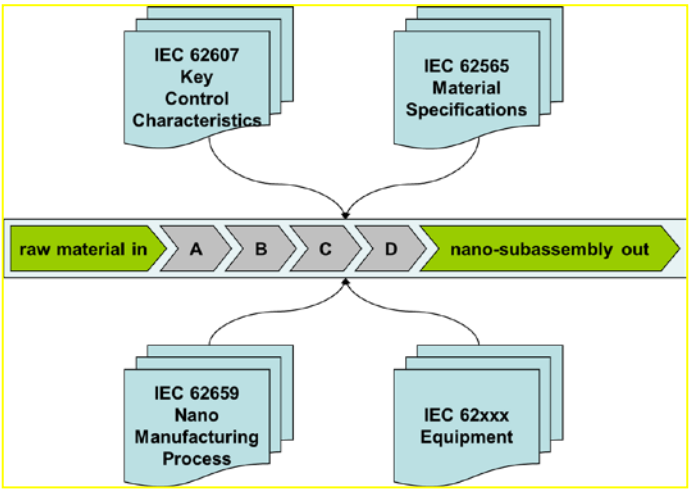

FIGURE 1. Standards regarding nanomanufacturing processes and equipment, material specifications and key control characteristics supports high quality fabrication of nanoenabled electrotechnical products.