

MS12: Advanced materials: fabrication & multiscale characterization (Dr. Mustapha Jouiad, Masdar Institute, United Arab Emirates)

The inherent increasing demand in energy solutions and new technologies in various sectors such as transport and environment has prompted scientists to custom the materials design and properties for targeted application. Most of the newly developed materials are complex composites with more and more reduced size and dimensions. Special fabrication techniques have then emerged to make the processing possible and easily tunable. Among these techniques and the list is not exhaustive: 3D/4D printing, Atomic Layer Deposition (ALD), Plasma Enhanced Chemical Vapor Deposition (PECVD), MOCVD (Metal Organic Chemical Vapor Deposition), Electron Beam & Thermal evaporators, Magnetron Sputtering, Electron beam and Photo lithography have attracted increasing interest due to their volatility and reproducibility. In parallel and to accommodate this progress made in nanomaterials, advanced characterization techniques covering different levels and scales appear as major tools to first evaluate the processing routes and parameters, then to correlate the fabricated materials to their targeted application. They include High Resolution Scanning Transmission Electron Microscopy (HRSTEM), Electron Energy Loss Spectroscopy (EELS), Scanning Near-field Optical Microscopy (SNOM), In situ experiments (TEM+AFM+SEM) and 3D imaging. The duality, which consists of closing the loop between these two aspects of fabrication and characterization in one hand and the material testing in the other hand, is necessary to achieve cutting-edge research and breakthrough. Ultimately, this approach will allow better prediction of the material design for the desired application. In addition, as this approach lies in cross disciplines, it gives to scientists the advantage to overcome the multidisciplinary aspect related to nanotechnology.

This mini-symposium is an opportunity to invite researchers in various disciplines related to advanced materials fabrication and characterization to submit their original findings as well as their review articles. The list of topics considered, but not limited to, includes materials processing (Experimental and modelling investigations) as well as novel characterization techniques (mechanical, thermal, optical and imaging). Wide range of applications in a variety of industrial sectors are also welcome.

