SYNT Oral

Fabrication of Metallic Anisotropic Particles

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Having the capability to fabricate programmable and advanced materials with designed properties and new functions has been of significant attention for the broad scientific community. One of the recent approaches to developing such capability in nano- and micro-materials is to introduce a spatial distribution of at least two components and benefit from the multifunctionality stemmed from this anisotropy for programmability or synergetic effects. Synthesis of anisotropic metallic particles at nano- or microscale is a challenging task due to the size-dependent limitations and the complex chemistry. In this presentation, we will introduce a novel technique for fabrication of metallic anisotropic structures that is simple, robust, scalable and environmentally friendly. The topological (Scanning Electron Microscopy), chemical (Back Scattering Electron Microscopy) and crystallographic (X-Ray Crystallography) characterization of fabricated particles will be presented. The capabilities of anisotropic particles depend also on the distribution of components throughout the particle. The focused ion beam is used in scanning electron microscopy to slice off the anisotropic particle for complete characterization. The results show that the fabricated particles do not have the core-shell structure (the core of the particle is same, but the components are distributed on the shell), but it is coreless (the anisotropy is throughout the particle). To conclude, in this presentation, the novel technique for fabrication of anisotropic particles will be introduced and its capabilities will be demonstrated on the model Bi-Sn system. The findings can be elaborated on the other systems as the technique allows easy adjustments over other combinations.

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References
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