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Soft Processing for Ceramics: Direct Fabrication of Nano-Structured Ceramic Films and Patterns from Solution without Firing of Powders/Particles Chair: Dr. Takayoshi Sasaki (MANA Principal Investigator)



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Nano-structured ceramics have generally been fabricated from nano-particles as building blocks via firing(sintering) after shape forming. However those processes would have serious problems in the consolidation: Shape forming and Sintering, i.e. agglomeration, loose and/or inhomogeneous packing, deformation/peeling/cracking and/or poor adhesion etc. due to 3D shrinkages of packed powders.

Instead of those powder/particle processing, direct fabrication of nano-structured ceramics is possible if approapriate precursors and processes are selected. We have developed Soft Processing or Soft Solution Processing as a bio-inspired process. As a summary review of Soft Procassing,the presentation includes guiding principles for the selection of [I] Precursors: (a) Solution (solute,solvent,and chelating agent,etc.),(b) Substrate(oftenly a reactant),and [II]Activated reaction(s) between them. Several examples, Film formation of BaTiO3,SrTiO3,LiCoO2,,CaWO4,SrWO4,Ferrites,and Pattern formation of CaWO4,TiO2,CeO2,BaTiO3,Carbon,etc. will be presented. Furthermore, a new concept and technology, "Growing Integration Layer [GIL] method " will be introduced to realize integrated multi-layers and/or coatings of ceramics on a substrate, i.e. bioactive ceramic layers on alloys and bulk metallic glasses.

Venue: Seminar Room #431, MANA Bldg. Date: July 5th Monday Time: <u>14:30-15:15</u>

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