MM 1: HV Horita

Time: Monday 9:30–10:00 Location: H 0107

Invited Talk MM 1.1 Mon 9:30 H 0107

Production of Multifunctional Materials Using High-Pressure Torsion — •Zenji Horita — Kyushu University, Fukuoka, Japan

High-pressure torsion (HPT) is a processing procedure to introduce intense strain under high pressure. It is capable of refining the grain size to the submicrometer or nanometer range in bulk forms of metallic materials. Second phase particles in the metal matrix can be fragmented to a fine dispersion of nanosized particles or even dissolution of the particles may occur by severe plastic deformation during HPT processing. It is also possible to consolidate powders at relatively low temperatures so that alloying is attained through solid-state reaction and fabrication of metal-matrix composites is feasible without successive sintering process. Nanostructure control is further achieved through subsequent combination of annealing or aging process. This presentation shows that HPT can produce materials exhibiting multifunctionality with not only better mechanical properties but also additional functional properties improved in hydrogen storage capability, thermoelectric properties, electronic and magnetic properties, corrosion resistance and so on. Some examples are introduced from our recent studies using the HPT process.