

STRUCTURE OF CRYSTALLOGRAPHICALLY CHALLENGED HYDROGEN STORAGE MATERIALS

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It is well known that size reduction to the nanoscale often leads to interesting material properties. Hydrogen storage materials are not exception. Numerous metastable alloys prepared by the mechanical alloying or ball milling methods are nano- or amorphous-phases or mixture of both and they exhibit interesting hydrogen storing properties [1]. An alternative way of preparing nano-phase hydrogen storage materials is packing them into porous materials [2,3]. Such nano-confinement allows materials to release high purity hydrogen at lower temperatures without a significantly long induction period. Despite of favorable changes in properties, little is known about the structure of both types of systems. This is partly because amorphous or nano-sized nature limits the use of conventional crystallographic analysis and, therefore, structural determination becomes very challenging. In this talk, I will present our local structural studies on such crystallographically challenged hydrogen storage materials by using the atomic pair distribution function technique [4]. The systems of interest are Mg_xCo_{100-x} alloys prepared by ball milling [5] and nano-phase ammonia borane (NH_3BH_3) confined in pores of mesoporous silica MCM-41 [6].

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