

IMPROVEMENT OF FIRST HYDROGENATION KINETICS OF BCC AND HIGH ENTROPY ALLOYS

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Metal hydrides are considered reliable and safe materials for storing hydrogen at a reasonable temperature and pressure, with relatively low cost and high hydrogen storage volumetric density. One common problem of metal hydrides is the slow kinetic of the first hydrogenation. This result in a higher cost of the material. It is thus very important to make the first hydrogenation as fast as possible under mild conditions. In this talk we will present a few strategies to improve the first hydrogenation for two systems: transition metals solid solution with body-cubic centred structure (BCC) and high entropy alloys (HEA). In the case of BCC, we show that the presence of a second phase rich in zirconium is the most beneficial way to improve the first hydrogenation. We also show that cold rolling is very efficient to regenerate an air-exposed sample. The investigation of HEA demonstrated that small particle size reduce the first hydrogenation time and that the incubation time follows an Arrhenius relationship.



Prof. Jacques Huot is UQTR and member of HRI since 2004. His expertises are solid-gaz interactions, metal hydrides, and material characterization. His research is on new metal hydrides for hydrogen storage and hydrogen embrittlement.