



BCC HIGH ENTROPY ALLOYS AS VERSATILE PLATFORMS FOR SOLID-STATE HYDROGEN STORAGE

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BCC-type materials including Medium Entropy Alloys (MEAs) and High Entropy Alloys (HEAs) have recently shown promising potential for solid-state hydrogen storage due to the high capacity of the corresponding metal hydride phases, large chemical homogeneity range and tunable thermodynamics. Many high-capacity BCC HEAs, which mostly contain early 3d and refractory metals, have been reported. However, the thermodynamics of these hydride phases and the multistep hydrogen uptake/release processes are not favorable for practical applications. Further compositional optimization is required before these alloys can be used in real-life applications. In this context, the main advantage of HEAs is their high chemical versatility, which allows their functional properties to be tuned, primarily through the strategy of elemental substitutions/additions.

This oral contribution will provide an overview of the latest developments in optimizing the chemical composition of BCC HEAs for hydrogen storage applications. It will demonstrate that the selection of the most promising HEAs involves compromises relating to thermodynamics, kinetics, cycle life stability and high reversible capacity. Despite the many scientific challenges posed by the complex interplay of physicochemical parameters and the vast compositional space of HEAs, as well as the trade-offs between several functional properties, this presentation will propose an understanding of the structure-function relationship in these promising alloys.