Study on the optimized design of solid-state hydrogen storage systems with the compressed chemical hydride

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A solid-state hydrogen storage system has considered as a promising technology for next-generation fuel-cell-powered transportation applications. In this system, effective management of heat and mass transfer is a significant issue to achieve the optimized system. Recently, the compressed metal hydride with materials of high thermal conductivity has been researched to achieve this goal. In this work, we performed 3D numerical simulation of heat and mass transfer for the optimal design of solid-state hydrogen storage system with the compressed NaAlHx with expanded natural graphite and graphene. Chemical kinetics and phase equilibrium during hydrogen storage processes were considered in this work. We will discuss the optimum design parameters to maximize the performance of hydrogen storage system.