

Study on 3D heat and mass transfer effects of solid-state hydrogen storage systems with compressed sodium alanate

지건구¹, 유동훈^{1,2}, 전영하³, 임홍영³, 정문선⁴, 임연호^{1,†}
¹전북대학교; ²경원테크; ³한온시스템; ⁴한국에너지기술
연구원

We performed the computer-aided design of the solid-state hydrogen storage system for next-generation fuel cell electric vehicles. The compressed sodium alanate of complex hydride with heat transfer promoters was considered as a hydrogen storage material to enhance effective thermal conductivity (ETC) in the storage system. In this work, the ETC properties were investigated experimentally for the 3D heat and mass transfer simulation. We discussed the details of chemical kinetics and phase equilibrium during hydrogen storage from the published literature. Main design factors such as the geometry of cooling pipes and fins are simulated in this work. We believe that this work will provide useful insights into the optimum design of solid-state hydrogen storage system.