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Novel hydrogen storage approaches using organometallics

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Storing molecular hydrogen in organometallics can ensure fast kinetics, low heat management, high energy efficiency, and superb reversibility. The gravimetric density is, however, low for room temperature storage. The reason for the too low density is because the binding is too weak. First-principles calculations [1,2] suggested that organometallics may significantly increase the binding, which is also correlated with decreasing inter-molecular distances and hence a significantly increased volumetric density [3]. Current experimental difficulties are twofold: a) how to synthesize the organometallics and b) how to avoid the transition metal atoms from clustering [4]? Recent experiment [5] on titanium- doped porous silica and theoretical predictions on calcium doping [3,6] may shed new lights on these difficult problems.

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