

## Nanomaterials for CO<sub>2</sub> mediated Hydrogen Storage

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Clean and sustainable energy sources have been extensively explored to mitigate the present energy and environmental concerns, mainly due to negative impacts of increasing consumption of fossil fuels on environment. Hydrogen (H<sub>2</sub>) has long been considered as a promising alternative energy carrier to address the above-mentioned issues for stationary and transportation applications, particularly in conjunction with fuel cells. To fully realize hydrogen economy, development of a hydrogen storage system that stores and delivers a large quantity of hydrogen in an economically viable and safe manner, which can resolve the safety and technical issues of the pressurized and liquid hydrogen methods, is of particular importance but has still remained as a great challenge. We present here on Pd based nanomaterials capable of dehydrogenating CO<sub>2</sub>-mediated hydrogen carrier, formic acid (HCO<sub>2</sub>H). Relevant mechanistic pathways with the nanomaterials are further proposed based on experimental as well as theoretical studies.