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Hydrogen storage through spillover at sun-2nm Pt nanoparticle - support interfaces SOMIK MUKHERJEE, BALAVINAYAGAM RAMALINGAM, SHUBHRA GANGOPADHYAY, University of Missouri — Hydrogen generation and storage are essential components in the increasingly important field of energy storage. Electrochemical generation of Hydrogen atoms at the surface of Pt like metals at select potentials is a widely studied phenomenon. However, moving these adsorbed Hydrogen atoms to high surface area support systems (primarily Carbon) for storage is an issue. We show spillover of these adsorbed Hydrogen atoms to the conducting transition-metal oxide support for sub-2 nm Pt nanoparticles sputtered on fluorine doped tin oxide (FTO) using cyclic voltammetry. The sub-2 nm Pt nanoparticles are deposited on oxide and carbon support systems using a unique tilted target sputtering (TTS) system developed by our lab. The resultant Pt nanoparticles are highly homogeneous, have high number density and are crystalline in nature. We propose integrating this sub-2 nm Pt nanoparticle-FTO system with different carbon structures to see if the spilled over hydrogen can be stored reversibly on adjacent carbon support systems and study the involved hydrogen spillover and storage mechanisms.

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