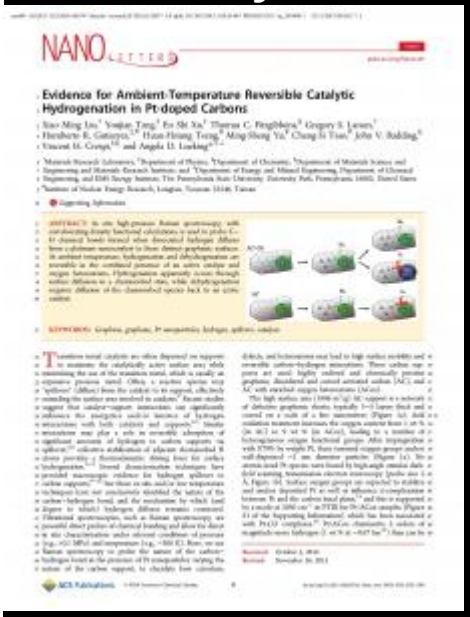
Lueking and co-workers resolve ?hydrogen spillover? controversy in recent Nano Letters paper


NANO LETTERS

Evidence for Ambient-Temperature Reversible Catalytic Hydrogenation in Pt-doped Carbons

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Angela Lueking, associate professor, Energy and Mineral Engineering and Chemical Engineering, recently published *Evidence for Ambient-Temperature Reversible Catalytic Hydrogenation in Pt-doped Carbons*, in *NanoLetters,* a high profile journal that reports on research in the fields of nanoscience and nanotechnology. The results of the study resolve a long-standing controversy in the literature on using *in situ* Raman spectroscopy to confirm a weak carbon-hydrogen chemical bond can form reversibly at ambient temperatures. In addition, the paper clarifies carbon surface properties that lead to high hydrogen mobility to populate a carbon surface. The topic has become controversial in recent years, after other groups reporting combined ambient temperature reversibility and mobility were not easily substantiated.

Although many materials have been proposed as a means by which to increase hydrogen density for storage as a fuel in fuel cell applications, most materials work at either high temperature or cryogenic conditions. Hydrogen storage at ambient temperature would significantly increase the feasibility and engineering design of hydrogen fuel tanks. In addition to hydrogen storage, identification of a reversible and mobile carbon-hydrogen bond has implications in material science, physics, chemistry, energy conversion devices, energy storage,

and electronics.

Dr. Lueking obtained her PhD in chemical engineering at the University of Michigan by developing materials that utilize hydrogen spillover as the mechanism for hydrogen uptake. Her formal academic training focuses on adsorption, surface science, environmental separations, and gas storage. She has continued work in hydrogen storage, hydrogen spillover, and novel adsorbents at Penn State. Her research pursuits have evolved to include development and advanced characterization of new carbon materials, new synthesis routes to existing carbon materials, low temperature H_2 evolution from processed coal, catalytic gasification, and fundamental studies of hydrogen spillover.

Liu, X. M.; Tang, Y.; Xu, E. S.; Fitzgibbons, T. C.; Larsen, G. S.; Gutierrez, H. R.; Tseng, H. H.; Yu, M. S.; Tsao, C. S.; Badding, J. V.; Crespi, V. H.; Lueking, A. D. Evidence for Ambient-Temperature Reversible Catalytic Hydrogenation in Pt-doped Carbons. *Nano Lett* **2012**, *29 Nov. 2012*.