An electrical study on primary hydrogen spillover from nanocatalysts to amorphous carbon support

Chikai Lin, Zhenzhen Yang, Tao Xu

Department of Chemistry, Northern Illinois University, DeKalb, IL 60115, USA

Hydrogen spillover is envisioned recently as a route to improve hydrogen storage capacity under ambient temperature. We develop a unique electrical method to monitor the primary spillover hydrogen. Discontinuous nanogranular Palladium film was deposited on the top of an amorphous carbon film to mimic catalytic metal nanoclusters on carbon supporter. As 30 bar hydrogen added, an obviously decreasing of electrical conductance of the carbon film was observed. In comparison, there is no change of conductance either on a bare amorphous carbon or Pd/carbon in pressurized helium. This phenomenon demonstrates a structure change involving the hydrogenation of the dangling carbon bonds and/or sp2-sp3 transition in the amorphous carbon while spillover hydrogen atoms were originated from nanocluster catalyst.