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High Capacity Hydrogen Sorption in Nanoscale Transition Metal Based Organometallic Complexes[1]

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Using a highly sensitive nanobalance we have discovered high capacity hydrogen absorption in a range of transition-metal(TM) based organometallic complexes prepared using physical vapor deposition techniques. Hydrogen absorption upto 14 wt% has been measured in titanium ethylene complexes and confirmed by mass doubling when deuterium is employed instead of hydrogen. I will present results of comprehensive measurements on other TM-complexes of alkenes, alkanes and ring compounds. I will also discuss these measurements in the context of theoretical calculations based on first principles quantum mechanics that have appeared in the recent literature. Finally, I will discuss the prospects for practical applications of these materials and the problems that might be encountered.

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