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Nano-Graphene Based Catalyst for Efficient Light Alkane Activation

Nanocarbon is a term increasingly used to indicate the broad range of carbon materials having a tailored nanoscale dimension and functional properties that significantly depend on their nanoscale features. Recently, lots of studies have demonstrated that nanocarbons, such as carbon nanotube (CNT), porous graphene and nanodiamond (ND) can be used as metal free catalysts for the light alkane dehydrogenation reaction, showing their potential applications to replace the traditional metal oxide catalyst. In this report, we will not only present our recent studies about the exploration of nanocarbons (graphene and graphene@nanodiamond hybrid nanocarbons) as metal free catalysts for the industrial dehydrogenation reaction, but also we will introduce the fabrication of nanocarbon materials (hollow carbon sphere and hollow graphene nanoshell) embedded by Au and Pd nanoparticles used in catalytic oxidation and hydrogenation reaction, and the stabilization of Pd, Pt nanoparticles, especially the atomically dispersed metal species on the novel nanodiamond@graphene hybrid nancarbons with core–shell structure for efficient light alkane dehydrogenation reaction. The detailed preparing process, characterization, catalytic performance and mechanism will be carefully discussed in the report [1-8].

References

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Figures

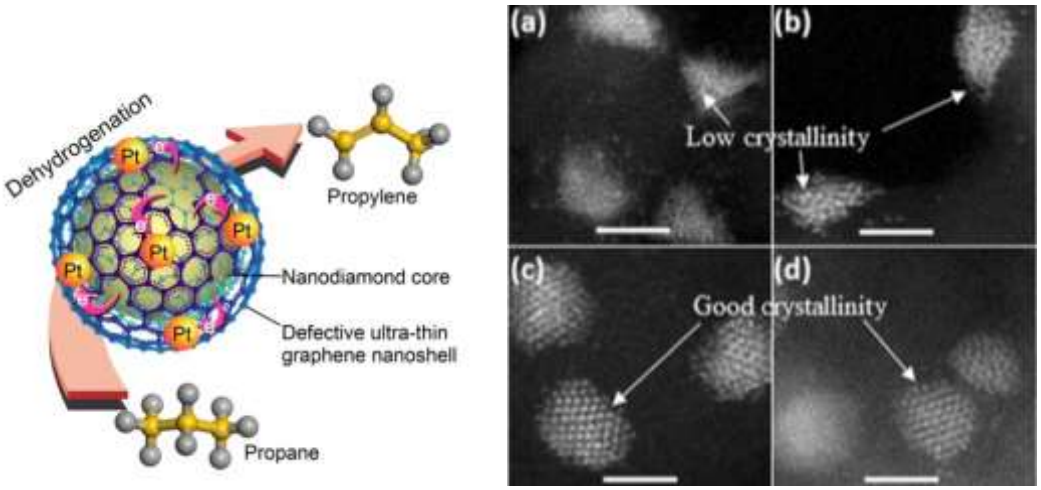

Figure 1: Scheme of Pt nanoparticles supported on the novel hybrid carbon support with a nanodiamond core and ultrathin graphene shell for the propane dehydrogenation reaction, HAADF-STEM images of the corresponding supported Pd nanoparticles: Pd/ND@G (a, b) and Pd/OLC (c,d).