# Selective Hydrogenation of Carbonyl Group in Furanic Aldehydes Using Ni Nanoparticle Catalysts

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The various sizes (3.7, 5.1, 6.8, 10.4 nm) of Ni nanoparticles were synthesized in the presence of organic surface capping agents. They were used to selective hydrogenate of unsaturated furanic aldehydes to their corresponding alcohols. The 6.8 nm Ni nanoparticles showed the highest yield because approach to the surface active sites on the smaller and larger nanoparticles was inhibited by the densely packed surface organic molecules and by their agglomeration due to magnetic attraction, respectively. In the case of selective hydrogenation of furfural (FFR), the capped Ni nanoparticles showed a high furfuryl alcohol (FFA) yield of 96%. Wheareas, significant over-hydrogenation was occurred over uncapped calcined Ni/$SiO_2$ with similar sized Ni nanoparticles. The steric hindrance of the surface active sites induced by the organic surface molecules led to selective hydrogenation of FFR to FFA. The capped Ni nanoparticles could be recycled repeatedly without any significant loss catalytic activity and selectivity. They also catalyzed the selective hydrogenation of other unsaturated furanic aldehydes to unsaturated furanic alcohols with high selectivity (> 90%).