

## Hydroisomerization of Middle Distillates Using Bifunctional Core-Shell Catalyst

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Core-shell catalyst demonstrated higher selectivity for middle distillates due to the comparatively lower diffusion limitations and less probability of re-adsorption of intermediates in the confined space of mesoporous silica shell. Monodispersed  $\text{Co}_3\text{O}_4$  nanoparticles were prepared by solvothermal route using polyvinylpyrrolidone (PVP) as capping agent and mesoporous silica coated by means of Stober process to prepare core-shell nanocomposites. To hydroisomerize the middle distillate fraction, bifunctional core-shell catalyst was developed by the incorporation of acidic sites in the framework of silica shell. The purpose of the present study is to evaluate the possibility of silica shell modification with the alumina and to study the effect of induced bifunctionality on the systematic migration of paraffins to the acid sites. FTS reaction over bifunctional core-shell catalyst showed increase in the molar ratio of Coother isomers/Cnormal-paraffin in the middle distillate fraction as compared to the conventional bifunctional catalysts. This concept of core-shell catalyst with the development of bifunctional property can be useful to carry out multiple steps catalytic processes, where multiple reactions occurred on different active centers.