# Site-selective blockage of Pt surface by residual capping ligand and its enhancing effect in heterogeneous enantioselective hydrogenation

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Heterogeneous enantioselective hydrogenation of α-keto esters is a structure-sensitive reaction. In this study, correlation between structure of Pt surface and enantioselectivity was investigated by controlling surface structure of $Pt/Al_2O_3$ catalysts. Site-selective blockage of polymer-capped $Pt/Al_2O_3$ catalysts were prepared using poly(vinyl pyrrolidone) (PVP) and poly(vinyl alcohol) with facile heat treatment process. Generally, the presence of residual capping agents on the Pt surface perturbs the adsorption of reacting species and reduces performances in structure-sensitive reactions. However, the PVP-$Pt/Al_2O_3$ catalyst exhibited an enhancement in both activity and enantioselectivity. We demonstrate that the different type of residual capping agents can lead to site-selective blockage of the Pt surface, that is, defects or terraces. Quantitative and qualitative analyses also show that the noticeable improvement in enantioselectivity is attributed to the stable adsorption of chiral modifiers on selectively exposed Pt terrace sites. The findings of this work provide insights into the enhancing effect of residual capping agents in structure-sensitive reactions.