

Palladium Supported on a Thermochemically Stable Poison-Containing Polymer Support for Tuning Chemoselectivity

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Partial hydrogenation of alkynes to alkenes is an important model reaction for studying chemoselectivity. It has been reported that Pd-based catalysts are the most promising choice for partial hydrogenation. Various selectivity modifiers are added either during the catalyst preparation or to the reactant feeds during the reaction. These modifiers can be adsorbed on the catalyst surface in moderate strength, which modulates the adsorption/desorption behaviors of reactants/intermediates. However, the modifiers should be continuously supplied to the reaction feeds to maintain selectivity, because they are readily decomposed or leached out during reactions.

In the present work, we supported Pd catalysts on a thermochemically stable covalent organic polymer (COP) containing diphenyl sulfide linkages which can act as a permanent modifier. Pd clusters were formed on the surface of the polymer matrix, where the sulfide groups of the polymer framework can cover the entire Pd surface. This leads to highly selective hydrogenation of various alkynes to alkenes with minimal conversion of other functional groups.