

Abstract

Disclosed is a hydrogenation catalyst, its preparation and application thereof, which catalyst comprises a carrier and a hydrogenation active metal component supported on the carrier, wherein the hydrogenation active metal component comprises at least one Group VIB metal component and at least one Group VIII metal component, the carrier being composed of phosphorus-containing alumina; when the hydrogenation catalyst is measured using a hydrogen temperature programmed reduction method (H_2 -TPR), the ratio of the peak height of the low-temperature reduction peak, $P_{\text{low-temp peak}}$, at a temperature of 300-500 °C to the peak height of the high-temperature reduction peak, $P_{\text{hi-temp peak}}$, at a temperature of 650-850 °C, i.e. $S = P_{\text{low-temp peak}}/P_{\text{hi-temp peak}}$, is 0.5-2.0; preferably 0.7-1.9, and more preferably 0.8-1.8. The hydrogenation catalyst shows excellent heteroatom removal effect and excellent stability when used in hydrotreatment.