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Effect of calcination temperature on the properties of Pt/SAPO-31 catalyst in one-stage transformation of sunflower oil to green diesel.

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Abstract

A series of bifunctional 1%Pt/SAPO-31 catalysts were prepared by the impregnation of SAPO material with H₂PtCl₆ solution followed by calcination at temperatures ranging from 250 to 650°C. Their performance in the one-stage sunflower oil transformation was studied. The high iso-alkanes yield was obtained only over samples calcined at 450-550°C. The decrease in calcination temperature as well as its increase results in a significantly lower iso-alkanes amount in the final product. The properties of the metal component in 1%Pt/SAPO-31 catalysts was characterized by XPS, TPR, SEM, TEM, H₂ chemisorption and studied in benzene hydrogenation. The acidic properties were evaluated by FTIR of adsorbed pyridine and tested in the hydroconversion of n-decane and 2,2,4-trimethylpentane (TMP). Despite the same chemical composition of 1%Pt/SAPO-31 catalysts, the variation of calcination temperature leads to observable change in Pt dispersion and surface acidity of SAPO material.

Keywords: hydroconversion, sunflower oil, green diesel, Pt/SAPO-31, Pt dispersion, acidity, isomerization, n-decane

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