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Abstract A series of Ti modified SBA-16 supports and their respective Ir-catalysts were prepared and characterized to study the effect of support preparation method on the dispersion of iridium and on the characteristics of Ir surface species. Two methods of incorporation of titania were tested: the sol-gel method in order to obtain Ti as heteroatom and incipient wetness impregnation to obtain Ti as TiO₂ (anatase phase). The results show that supports with different Ti species and dispersion can be obtained. The final catalyst was characterized at different preparation stages by XRD, elemental analysis and BET. The presence of Ti as Ti⁴⁺ in the nanostructure of SBA and as TiO₂ (anatase phase) was analyzed by UV-Vis-DRS and Raman spectroscopy. The iridium oxidation state upon Ti-containing SBA-16 was studied by XPS, EDX, TEM and XRD, arriving at the good proportion of Ir⁰. H₂ chemisorption and TEM characterization for Ti-SBA-16 indicated that Ir particle size was lower than anatase/SBA-16. The catalyst that we synthesized had good activity measured in tetralin hydrogenation in presence of quinoline at mild conditions. The experimental data were quantitatively represented by a modified Langmuir-Hinshelwood-type rate equation. The preliminary results show these materials as promising catalysts for HDS/HDN reactions.

Keywords Iridium-containing SBA-16 · Titanium-modified SBA-16 · Ti incorporation method · Hydrogenation · Inhibition · Reaction kinetics