

Topics I

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## Synthesis and activation of ruthenium sulfide catalysts highly active in HDS

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In 1981 Pecoraro and Chianelli [1] published a complete study of catalytic hydrodesulfurization (HDS) of dibenzothiophene (DBT) over transition metal sulfides, in which was found a periodic tendency of the metallic sulfides activity and ruthenium sulfide showed the highest HDS activity, these results were corroborated later by Raje et al. [2] and Liaw et al. [3]. Despite of Pecoraro results, the recent studies reported for ruthenium sulfide catalysts barely have achieved activities similar to those of industrial catalyst and only a few have reached the activity reported by Pecoraro. In this research work, the synthesis and activation of ruthenium sulfide catalysts were performed through synthesis of a new ruthenium complex precursor using a simple methodology, which is activated at different atmospheres allowing to obtain a ruthenium sulfide catalyst up to 10.5 times more active in the HDS of DBT [4, 5] than the activity of an industrial catalyst. The figure 1 shows comparatively the HDS of DBT activity results of catalysts of molybdenum, two industrial catalysts and the ruthenium sulfide catalysts, including those obtained in this research work.





Figure 1: HDS de DBT activity of a)  $MoS_2$  [6], b) NiMo industrial catalyst, c) KF-757 industrial catalyst, d) ruthenium sulfide from reference, and obtained activated with e)15%  $H_2S/H_2$ , f)15%  $H_2S/N_2$  and g)  $H_2S$ .

## References

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