



národní
úložiště
šedé
literatury

Niobia Supported Molybdenum Sulfide Hydrodesulfurization Catalysts Prepared using Nitrilotriacetic Acid.

Kaluža, Luděk
2016

Dostupný z <http://www.nusl.cz/ntk/nusl-261516>

Dílo je chráněno podle autorského zákona č. 121/2000 Sb.

Tento dokument byl stažen z Národního úložiště šedé literatury (NUŠL).

Datum stažení: 28.09.2024

Další dokumenty můžete najít prostřednictvím vyhledávacího rozhraní nusl.cz.

**NIOBIA SUPPORTED MOLYBDENUM SULFIDE
HYDRODESULFURIZATION CATALYSTS PREPARED
USING NITRILOTRIACETIC ACID**

Luděk Kaluža and Miroslav Zdražil

*Institute of Chemical Process Fundamentals of CAS, v. v. i.; Rozvojová 135; 165 02
Prague 6–Suchbát, Czech Republic*

The effect of addition of chelating agent nitrilotriacetic acid, NTA, to the impregnation solution of ammonium heptamolybdate, AHM, for preparation of Mo/Nb₂O₅ hydrodesulfurization, HDS, catalysts was studied. The Nb₂O₅ support was obtained by calcination of commercial Nb₂O₅·xH₂O at 400 °C and its surface area, S_{BET}, was 93 m² g⁻¹. In contrast to previous papers dealing with NTA Co(Ni)Mo/Al₂O₃ HDS catalysts (references are given in ¹), NH₄OH was not used in the preparation of AHM-NTA impregnation solution in the present paper. The natural pH of this solution was about 2. The catalysts were tested in HDS of thiophene at total pressure 1 MPa. The NTA Mo/Nb₂O₅ samples were not calcined before sulfidation. The dependence of weight activity on MoO₃ loading was compared for Mo/Nb₂O₅, NTA Mo/Nb₂O₅ and conventional Mo/Al₂O₃ catalysts. The activity of Mo/Nb₂O₅ samples was low, irrespectively of loading. The activity of Mo/Al₂O₃ catalysts increased up to the monolayer loading of about 22 wt.% MoO₃ (S_{BET} of Al₂O₃ was 262 m² g⁻¹) and was much higher than that of Mo/Nb₂O₅ samples. However, the use of NTA improved HDS activity of Mo/Nb₂O₅ catalysts; the effect increased with MoO₃ loading and it was one order of magnitude at high loadings of 20-25 wt.% MoO₃. Surface area of sulfided NTA Mo/Nb₂O₅ catalysts was only 35-40 m² g⁻¹, while that of conventional Mo/Al₂O₃ was about 210 m² g⁻¹. However, surface area activity per 1 m² of NTA Mo/Nb₂O₅ samples was much higher than that of conventional Mo/Al₂O₃ catalysts. At the loading of 22 wt.% MoO₃, the ratio of these activities was 5.1, which is higher than that achieved in previous papers in the literature. In spite of low surface area of sulfided NTA Mo/Nb₂O₅ catalysts, their weight activity per 1 g was higher than that of conventional Mo/Al₂O₃ samples in the broad loading range of 10-25 wt.% MoO₃. Mo/Nb₂O₅ catalysts with such high relative weight normalized activity were not reported in the literature up to now. The high activity was not achieved by increasing the extensive factor i.e. surface area of Nb₂O₅ support. S_{BET} of the starting Nb₂O₅ was not radically higher than it was reported in previous papers in the literature. Unprecedentedly high weight normalized activity of Mo/Nb₂O₅ catalysts was achieved by addition of NTA to the impregnation solution without use of NH₄OH to dissolve it.

Acknowledgements:

The financial support of the Grant Agency of the Czech Republic was gratefully appreciated and acknowledged (Grant No. P106/11/0902).

Reference:

¹ Kaluža, L.; Zdražil, M. *Current Topics in Catalysis* **2014**, *11*, 65-74.