Sociedad Mexicana de Materiales A.C.

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**Griselda Mendoza Gómez**
CIMAV

I am pleased to inform you that your contribution **"STUDY OF TITANIUM AS PROMOTER IN RUTHENIUM SULFIDE UNSUPPORTED CATALYST FOR DEEP HDS."** by *Griselda Mendoza Gómez, Lorena Álvarez Contreras, Alfredo Aguilar Elguezabal, Carlos Elías Ornelas Gutierrez,* has been **accepted** to be presented in symposium **6A, Advanced Catalytic Materials** at the XXIV International Materials Research Congress, to be held in Cancun in August 16 - 20, 2015.

The presentation has been accepted in the **Talk** modality. Remember that in order to include your abstract in the program book you must register before June 7th, 2015.

**Organizer of the Simposium**
*"Advanced Catalytic Materials"*

# STUDY OF TITANIUM AS PROMOTER IN RUTHENIUM SULFIDE UNSUPPORTED CATALYST FOR DEEP HDS.

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The high consumption of fossil fuels and the exhaustion of light oil have brought the need of deep extraction and as a consequence the improvements in the catalyst design. Actually current researches have focused on the development of catalytic materials with high sulfur removal capacity [1]. According to the literature several authors agree that a ruthenium sulfide catalyst is a material with high catalytic activity [2-4], superior to the traditional molybdenum sulfide catalyst, making it an excellent candidate to meet the current challenge. In previous work by our group using a new ruthenium precursor it was achieved to synthesize ruthenium sulfide catalyst with catalytic activity higher than industrial ones [5-8]. Unfortunately the high cost of this catalyst is the main limitation despite its high development.

In this research work a ruthenium sulfide catalyst promoted with titanium was synthesized; different titanium/ruthenium atomic ratio was studied; the synthesis was done according to the previous work reported by our group when a complex ruthenium precursor route was followed to synthesized the bimetallic complex; followed by an activation process. The Hydrodesulfurization (HDS) of dibenzothiophene (DBT) studies were carried out in a Parr model 4560 high-pressure batch reactor and the materials were characterized by thermogravimetric analyses, scanning and transmission electron microscopy, X-ray diffraction, and surface area by BET method. The titanium showed a positive effect over ruthenium sulfide achieving catalytic activity some times greater than molybdenum sulfide base industrial catalysts; according to our results complex bimetallic precursor route reported previously is suitable way to achieve high activity titanium/ruthenium sulfide catalysts including high content of titanium.

**Keywords:** Ruthenium sulfide, titanium promoter, HDS

References:

(1) Michèle Breysse, Gérald Djega-Mariadassou, Stéphanie Pessayre, Christophe Geantet, Michel Vrinat, Guy Pérot, Marc Lemaire, Catalysis Today 84 (2003) 129–138
(2) Pecoraro T. A. and Chianelli R. R., Journal of Catalysis, 67 Issue 2 (1981), 430-445.
(3) Raje A. P, Liaw S-J, Srinivasan R. and Davis B. H, Applied Catalysis A: General 150 (1997), 297-318.

(4) Liaw S-J., Lin R., Raje A. and B. H. Davis, Applied Catalysis A: General 151 (1997), 423-435.
(5) Ornelas Gutiérrez Carlos Elías, Alvarez Contreras Lorena, Farias Mancilla José Rurik, Aguilar Elguezabal Alfredo. Mexican patent MX/a/2011/013529
(6) Ornelas Gutiérrez Carlos Elías, Alvarez Contreras Lorena, Farias Mancilla José Rurik, Aguilar Elguezabal Alfredo. (2015) US Patent 8,987,165 B2.
(7) Ornelas Gutiérrez Carlos Elías, Alvarez Contreras Lorena, Farias Mancilla José Rurik, Aguilar Elguezabal Alfredo. Mexican patent MX/a/2011/013531.
(8) Ornelas Gutiérrez Carlos Elías, Alvarez Contreras Lorena, Farias Mancilla José Rurik, Aguilar Elguezabal Alfredo. (2014) US Patent 8,853,119 B2.

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■ **13:15 - 13:30 S6A-0008 STUDY OF MEXICAN HEAVY CRUDE OIL UPGRADING USING NiMo, NiW, CoMo and NiCoMoW CATALYSTS**

**P. Schacht-Hernández[1], B. Portales-Martínez[1], J.M. Domínguez-Esquivel[1].**

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▶ **13:30 - 14:00 S6A-0009 *Invited Talk* ELECTRON MICROSCOPY ADVANCES IN HYDROTREATING CATALYSIS**

**Stig Helveg[1],**

[1]Haldor Topsoe, Denmark.

**14:00- 16:00 LUNCH**

■ **16:00 - 16:15 S6A-0010 IN-SITU CONVERSION OF AGUACATE HEAVY CRUDE OIL USING LIQUID CATALYSTS.**

**Leonardo Diaz-García[1], M.T. Gómez[1], J.M. Domínguez[1] y G. Zariñán[1]**

[1]Instituto Mexicano del Petróleo, Mexico

■ **16:15 - 16:30 S6A-0011 LOWERING SYNTHESIS TEMPERATURE of Ni2P/C BY PALLADIUM ADDITION: EFFECT OF PALLADIUM SOURCE**

**L. F. Feitosa[1], G. Berhault[2], D. Laurenti[2], T. E. Davies[3], V. Teixeira da Silva[1]**

[1]NUCAT/PEQ/COPPE/Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil. [2]Institut de recherches sur la catalyse et l'environnement de Lyon (IRCELYON), (France). [3]Stephenson Institute for Renewable Energy, Chemistry Department, University of Liverpool, UK

■ **16:30 - 16:45 S6A-0012 CHARACTERIZATION OF NICKEL/RUTHENIUM SULFIDE CATALYST FOR HYDRODESULFURIZATION OF DIBENZOTHIOPHENE**

**C. Ornelas-Gutiérrez [1], S. Verastegui[2], A. Aguilar-Elguézabal[1] and L. Alvarez-Contreras[1]**

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▶ **16:45 - 17:15 S6A-0013 *Invited Talk* ACTIVE PHASE OF A NICKEL PHOSPHIDE (NI2P) CATALYST SUPPORTED ON KUSY ZEOLITE FOR THE HYDRODESULFURIZATION OF 4,6-DMDBT**

**S. Ted Oyama[1,2], Yong-Kul Lee[3], Kiyotaka Asakura[4], Kyoko K. Bando[5], Yuji Yoshimura[5]**

[1]The University of Tokyo, Department of Chemical Systems Engineering, Tokyo, Japan. [2]Department of Chemical Engineering, Virginia Tech, Blacksburg, Virginia [3]Department of Chemical Engineering, Dankook Univerity, Yongin, Korea. [4]Catalysis Research Center, Hokkaido University, Sapporo, Japan. [5]National Institute of Advanced Industrial Science and Technology, AIST, Japan

■ **17:15 - 17:30 S6A-0014 HIGHLY ACTIVE UNSUPPORTED NICKEL-ZINC-MOLYBDENUM CATALYSTS DERIVED FROM ISOSTRUCTURAL REPLACEMENT FOR THE HYDRODESULFURIZATION OF DIBENZOTHIOPHENE**

**H. Liu[1], C. Liu[1], C. Yin[1]**

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■ **17:30 - 17:45 S6A-0015 STUDY OF TITANIUM AS PROMOTER IN RUTHENIUM SULFIDE UNSUPPORTED CATALYST FOR DEEP HDS.**

**G. Mendoza-Gómez[1], L. Álvarez-Contreras[2], A. Aguilar-Elguézabal[2] and C. Ornelas-Gutiérrez[1,]**

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■ **17:45 - 18:00 S6A-0016 SULFUR ELIMINATION BY OXIDATIVE DESULFURIZATION WITH TITANIUM-MODIFIED SBA-16**

**Lorena P. Rivoira[1], Verónica A. Vallés[1], Brenda C. Ledesma[1], María V. Ponte[1], María L. Martínez[1], Oscar A. Anunziata[1] and Andrea R. Beltramone[2]**

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■ **18:00 - 18:15 S6A-0017 OXIDATIVE DESULFURIZATION OF ORGANOSULFUR COMPOUNDS IN A MODEL MIXTURE OF SCRAP TIRE PYROLYSIS OIL**

**Gómez-Ibáñez[1], V. Rojas-García[1]**

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