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PREPATION OF NICKEL CATALYSTS SUPPORTED ON CeO_2, Al_2O_3 AND ZrO_2 FOR PARTIAL OXIDATION OF METHANE

Tuğçe Çınar, Tuba Gürkaynak Altınçekiç*

Department of Chemical Engineering, Istanbul University, 34320, Istanbul, Turkey
e-mail: tubag@istanbul.edu.tr

Hydrogen, a flexible fuel, is thought to be the cleanest energy source of 21st century as it can be used in many fields without polluting the environment.[1] Methane is referred to be the most significant source of hydrocarbon as it is the major component of natural gas and natural gas exists on earth profusely. In recent years, a catalytic partial oxidation of methane to synthesis gas: CO and H_2 has been widely investigated as an attractive alternative process to steam reforming.[2] Noble metals are relatively stable and active in catalytic partial oxidation process,[3] high cost and limited access to those metals made Ni based catalysts as best alternative in catalytic partial oxidation of methane.

In this work supported Ni catalysts (Ni/Al_2O_3, Ni/ZrO_2-Al_2O_3, Ni/ZrO_2-CeO_2, Ni/CeO_2-Al_2O_3, Ni/ZrO_2–Al_2O_3-CeO_2) were prepared by impregnation method and tested in the catalytic partial oxidation of methane to investigate the effect of support material. The catalysts were characterized by Brunauer Emmett Teller (BET), X-ray diffraction (XRD), temperature programmed reduction (TPR) and Temperature programmed oxidation (TPO) and High Resolution Transmission Electron Microscopy (HR-TEM)

Then reactant gas mixture ($CH_4/O_2/N_2$=29/15/60) was fed to the reactor with the flow rate of 105 mL/min (GHSV=157,500 L kg-1 h-1). Effluents were analyzed at 800 °C. During the activity tests, carbon balances were always within 95-100%. The stability tests were carried out using excess methane in order to accelerate the deactivation rate of the catalysts ($CH_4/O_2/N_2$ = 58/15/58) at 800°C for 10 h.

Key words: POM; CeO_2-ZrO_2; γ-Al_2O_3; Ni based catalyst

References

[1] N.Z. Muradov, T.N. Veziroğlu, International Journal of Hydrogen Energy, 30,2005, 225.

[2] A. S. Larimi, S. M. Alavi, International Journal of Chemical Engineering and Applications, 3,1,2012, 6-10.

[3] Ji, Y., Li, W., Xu, H., Chen, Y., Applied Catalysis, 213, 2001, 25-31.

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Sayın Tuba Gürkaynak Altınçekiç

23-26 Nisan 2014 tarihinde Adana'da düzenlenecek olan 5. Ulusal Kataliz Kongresinde sunulmak üzere göndermiş olduğunuz « Metanın Kısmi Oksidasyonu İçin CeO_2, Al_2O_3 VE ZrO_2 Destekli Ni Katalizörlerinin Hazırlanması » başlıklı bildiriniz Kongre Bilim Kurulu tarafından incelenmiş ve poster sunum olarak kabul edilmiştir.

Düzenleme kurulu adına göstermiş olduğunuz ilgi ve katkılarınız için teşekkür eder, kongrede görüşmek dileğiyle saygılar sunarız.

Prof. Dr. Bilgehan Güzel
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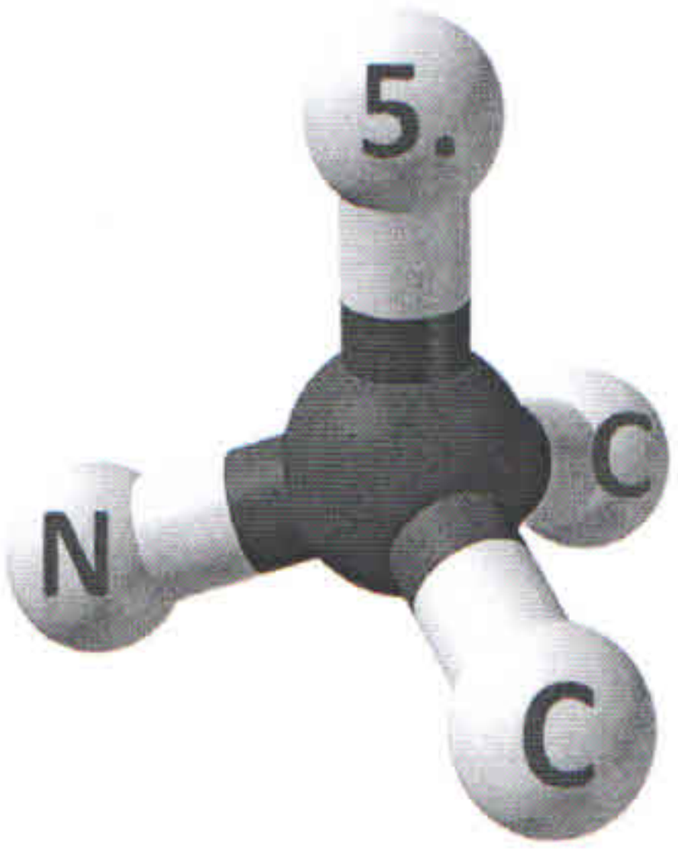
Çukurova Üniversitesi Fen Edebiyat Fakültesi Kimya Bölümü
Tel (phone): +90 322 338 6084-2570 Faks (fax): +90 322 338 6070
E-posta (e-mail): bilgehan@cu.edu.tr –
Web: http://ncc5.cu.edu.tr/tr/

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PROGRAM

April 23-26, 2014

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DAY 1 (23.04.2014)

15:00-17:00	Registration
17:00-18:00	Catalysis Society General Assembly Meeting
18:15-21:00	Welcome Reception at Turquaz Cafe (Campus)

Day 2 (24.04.2014)	
09.00 - 09.30	**Opening Remarks**
I	Ch. P.: Prof. Dr. Deniz Üner
09:30 - 10:30	Dr. Jens Rostrup- Nielsen Director R&D Division and Member of Executive Board,Haldor Topsoe A/S / Challenges to industrial catalysis
10:30 - 10:50	Coffee Break
II	Ch. P.:Assoc. Prof. Dr. Emrah Özensoy
10:50 - 11:30	Prof. Dr. Can Erkey / Koç University / Supercritical Deposition: A new route for synthesis of supported metallic nanoprticles for catatlytic applicaitons
11:30 - 11:50	Aybüke Leba / Boğaziçi University / Oxidative Coupling of Methane over Na2WO4/Mn/SiO2 Catalyst
11:50 - 12:10	Zafer Say / Bilkent / NOx Storage and Reduction Pathways on Zirconia and Titania Functionalized Binary and Ternary Oxides as NOx Storage and Reduction (NSR) Systems
12:10 - 12:300	Cemre Avşar / METU / Effect of Vanadium Doping on the Photocatalytic Activity of Zinc Oxide Thin Films
12:30-14:00	LUNCH : Central refectory
III	Ch. P.: Prof. Dr. Saim Özkar
14:00 - 14:40	Prof. Dr. Pierre H. Dixneuf / University of Rennes / Catalytic C-H bond activation/functionalisation
14:40 - 15:00	Assoc. Prof. Dr. Önder Metin / Atatürk University / Selective Electrochemical Reduction of CO2 to CO Catalyzed by Monodisperse Gold Nanoparticles
15:00 - 15:20	Melek Selcen Başar / Boğaziçi University / CO-free Hydrogen Production from Propane by using Serial OSR-PROX Reactors
15:20 - 15:40	Coffee Break
IV	Ch. P.: Prof. Dr. Gülşen Doğu
15:40 - 16:20	Prof. Dr. Christian Bruneau / University of Rennes / (Phosphinesulfonate) Ruthenium catalysts for proton transfer and hydrogen borrowing reactions
16:20 - 16:40	Hale Ay / METU / Preparation of Ni/Al2O3 catalysts by polyol method for carbon dioxide reforming of methane
16:40 - 17:00	Assoc. Prof. Dr. Niyazi Alper Tapan / Gazi University / Characterization of Ceria Nano-composites and Their Performance of in Direct Alcohol Fuel Cells
17:00- 17:20	Burçin Temela / Haldor Topsøe A/S DENMARK / Higher Alcohols Synthesis: Perspectives from DFT and experiments
17:20 -19:30	POSTER SESSION