



5th NATIONAL

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Book of Abstracts

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Çukurova University, Adana / TURKEY



PREPATION OF NICKEL CATALYSTS SUPPORTED ON CeO₂, Al₂O₃ AND ZrO₂ FOR PARTIAL OXIDATION OF METHANE

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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 H₂ 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/Al₂O₃, Ni/ZrO₂-Al₂O₃, Ni/ZrO₂-CeO₂, Ni/CeO₂-Al₂O₃, Ni/ZrO₂-Al₂O₃-CeO₂) 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 (CH₄/O₂/N₂=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 (CH₄/O₂/N₂ = 58/15/58) at 800°C for 10 h.

Key words: POM; CeO₂-ZrO₂; γ-Al₂O₃; 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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5. ULUSAL KATALİZ KONGRESİ

23-26 Nisan 2014 | Çukurova Üniversitesi, Adana



Poster Sunum Kabul Belgesi

17 Şubat 2014

Sayın Tuba Gürkaynak Altınçekiç

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

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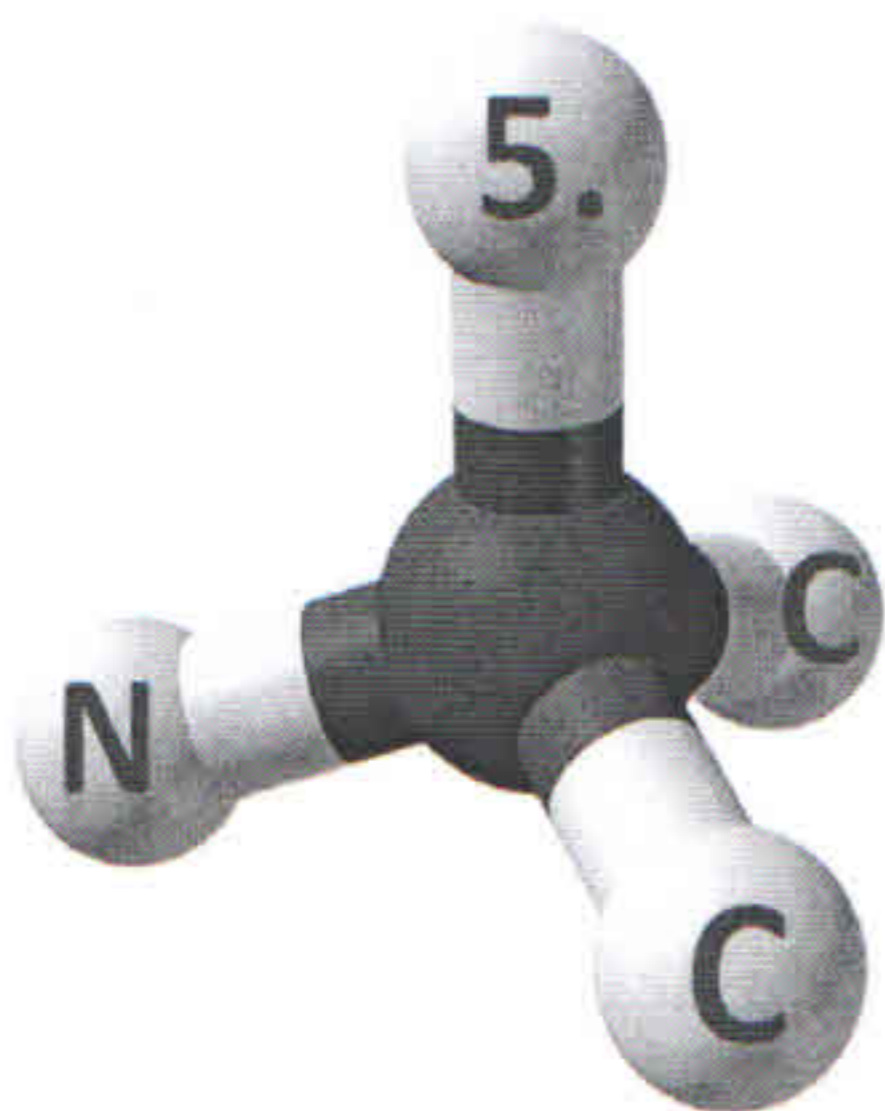
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PROGRAM

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 nanoparticles for catalytic applications
11:30 - 11:50	Aybüke Leba / Boğaziçi University / Oxidative Coupling of Methane over Na ₂ WO ₄ /Mn/SiO ₂ Catalyst
11:50 - 12:10	Zafer Say / Bilkent / NO _x Storage and Reduction Pathways on Zirconia and Titania Functionalized Binary and Ternary Oxides as NO _x Storage and Reduction (NSR) Systems
12:10 - 12:30	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 CO ₂ 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/Al ₂ O ₃ 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 Nanocomposites 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