Accepted Manuscript

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Alfredo Aloise, Enrico Catizzone, Massimo Migliori, Jànos B. Nagy, Girolamo Giordano

PII: S1004-9541(16)31420-3
DOI: doi:10.1016/j.cjche.2017.04.016
Reference: CJCHE 852

To appear in:

Received date: 23 December 2016
Revised date: 1 March 2017
Accepted date: 25 April 2017

Please cite this article as: Alfredo Aloise, Enrico Catizzone, Massimo Migliori, Jànos B. Nagy, Girolamo Giordano, Catalytic behavior in propane aromatization using GA-MFI catalyst, (2017), doi:10.1016/j.cjche.2017.04.016

Energy, Resources and Environmental Technology

Catalytic behavior in propane aromatization using GA-MFI catalyst

Alfredo ALOISE, Enrico CATIZZONE, Massimo MIGLIORI*, Jànos B.NAGY, Girolamo GIORDANO

University of Calabria, Department of Environmental and Chemical Engineering, Via P. Bucci – I-87036 Rende (CS), Italy

ABSTRACT

Ga-Al-MFI samples were synthesized in hydrothermal conditions from gels of composition 1.08CH_3NH_2-0.134TPABr-1SiO_2-x Al_2O_3-y Ga_2O_3 -40H_2O at 175°C for 7 days, with x=0.005 and 0.0025, y=0.005, 0.010 and 0.020. The samples were characterized by XRD, BET measurements, thermal analysis (TGA-DTA) atomic absorption and high resolution solid state MAS ^{27}Al and ^{71}Ga NMR measurements. The aromatization of propane was studied as catalytic test. The activity and selectivity of the catalysts were determined for benzene, toluene and xylenes on one hand and for methane and ethane on the other hand. The most active sample was obtained with the highest Ga/Al ratio . For this sample, the BTX selectivity obtained by aromatization was always higher than the hydrocracking selectivity leading to methane and ethane. The relative amount of toluene was higher than that of benzene and of xylenes. The samples were deactivated by coke formation that was revealed more severe for the most active sample.

Keywords: Propane aromatization; Gallium; ZSM-5; Coke formation; Catalyst deactivation.

1. INTRODUCTION

* Corresponding author
Email: massimo.migliori@unical.it
Telephone: +39 0984/496641