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Authors: Shashikant A. Kadam, Mariya V. Shamzhy

PII: S0920-5861(17)30627-2
DOI: http://dx.doi.org/10.1016/j.cattod.2017.09.020
Reference: CATTOD 11025

To appear in: *Catalysis Today*

Received date: 26-5-2017
Revised date: 19-7-2017
Accepted date: 9-9-2017

Please cite this article as: Shashikant A.Kadam, Mariya V.Shamzhy, IR Operando Study of Ethanol Dehydration over MFI Zeolite, Catalysis Todayhttp://dx.doi.org/10.1016/j.cattod.2017.09.020

IR Operando Study of Ethanol Dehydration over MFI Zeolite

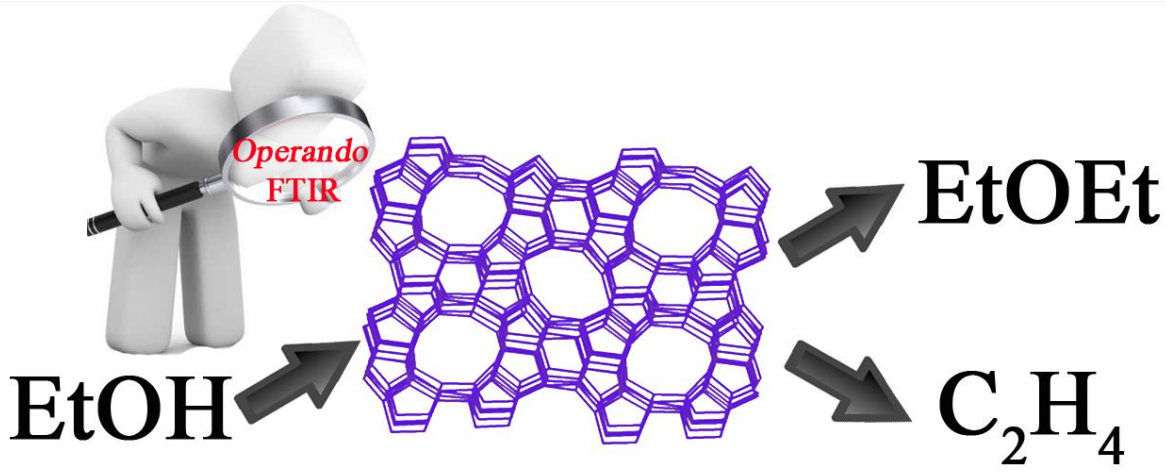
Shashikant A. Kadam,[a,b*] Mariya V. Shamzhy,[a,b*]

[a]*Department of Physical and Macromolecular Chemistry, Faculty of Science, Charles University in Prague, Hlavova 2030, 12840 Prague 2, Czech Republic*

[b]*J. Heyrovsky Institute of Physical Chemistry, Academy of Sciences of the Czech Republic, v. v. i., Dolejškova 3, CZ-182 23 Prague 8, Czech Republic*

[*]Corresponding authors.
E-mail address: *shashikant.kadam@jh-inst.cas.cz*; *mariya.shamzhy@jh-inst.cas.cz*

Graphical abstract



Highlights

- IR Operando spectroscopy allows to follow ethanol dehydration pathways in H-**MFI**
- Reaction conditions govern the amount of formed ethanol monomer and dimer species
- Dimer-assisted etherification is favored at high pressure and low temperature
- DEE decomposition contributes to ethylene formation over H-**MFI** at 488 K

Abstract

Zeolite-catalyzed dehydration of ethanol is an attractive economically feasible route for production of ethylene and butenes. The goal of this contribution is to monitor the intermediate species on the surface of "working" catalyst to rationalize the influence of the reaction conditions and zeolite characteristics on the dehydration pathways. With this respect the rates of diethyl ether (DEE) and ethylene formation in ethanol dehydration along with the quantification