



Conversion of Ethanol to Diethyl acetal at Atmospheric Pressure over Cu/SBA-16 Catalysts

Gidyonu Paleti^{1,2}, Prathap Challa^{1,2}, Kamaraju Seetha Rama Rao¹
and David Raju Burri^{1*}

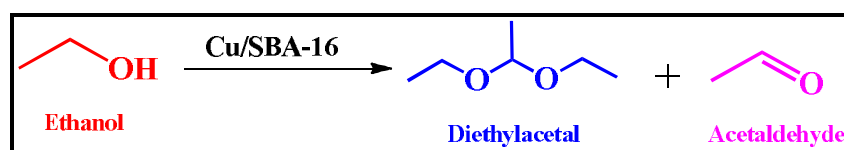
1. Catalysis and Fine Chemicals Division, CSIR-Indian Institute of Chemical Technology, Hyderabad-500007, **INDIA**
2. AcSIR-Academy of Scientific and Innovative Research, Gaziabad,-201002, **INDIA**
. Email: david.iict@gov.in

Accepted on 17th August, 2020

ABSTRACT

Copper nanoparticles in cage-like pores of SBA-16 were prepared by wet impregnation method and used in dehydrogenative reactions ethanol to commodity and specialty chemicals such as acetaldehyde and diethylacetal (DEE). The physicochemical features of the synthesized catalysts were characterized by X-ray diffraction, N₂-physisorption, SEM, TEM, temperature-programmed desorption of ammonia, TPR and N₂O pulse chemisorption. These analyses showed that Cu/SBA-16 catalysts maintained mesoporous structure of parent SBA-16 and that copper particles were highly dispersed in uniform pore channels of SBA-16. 24 wt% Cu/SBA-16 exhibited a maximum ethanol conversion of 62% and 63% selectivity to diethyl acetal. The superior catalytic activity in terms of conversion and selectivity during time on stream operation exhibited by Cu/SBA-16 catalyst is due to high dispersion and small particle sizes of Cu.

Graphical Abstract



Direct conversion of ethanol to diethyl acetal and acetaldehyde

Keywords: Ethanol, Cu/SBA-16, Acetaldehyde, Diethyl acetal.