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Esterification process catalyzed by ZSM-5 Zeolite synthesized via modified hydrothermal method

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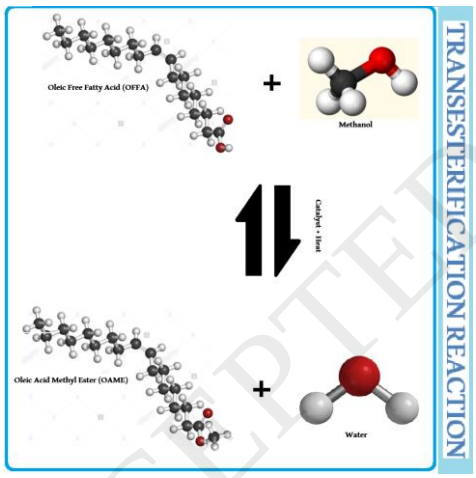
Graphical abstract



Abstract

A modified hydrothermal method for ZSM-5 synthesis was described. The crystals gave a typical pattern (2θ at around 22.5°, 24.0° and 29.8° corresponding to the major peaks of (501,303 and 503 crystal surfaces), which indicated that the subnanocrystals could have the primary structure of MFI-type zeolites. the FT-IR spectra of subnanocrystals which have the primary structure of MFI zeolites .Oleic acid methyl ester (OAME) was prepared via a rapid derivatization procedure. the acidic strength is determined by the zeolite crystal structure and the higher esterification rate of ZSM-5 can be attributed to its stronger acidity compared to H_2SO_4, especially after 50 min of reaction. ZSM-5 can be an excellent substitute to sulfuric acid which caused corrosion and equipments damage.