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ZIF-8 nanoCatalyzed [1]Ring-Opening Reaction of Epoxides with Acyi Halides

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Abstract:The ring-opening of epoxides with acyl halides in the persence of ZIF-8 as Catalyst affording the correspond 2-haloalkyl esters[3]. Transformation of epoxides to 1,2-disubstituted alkanes is one of the important processes in organic syntheses, and extensive studies on the regio- and stereochemistry of the ring-opening reaction of epoxides with several nucleophiles catalyzed by transition metals have been reported.' In continuing studies, we We showed that the ZIF-8 catalyzes the ring-opening reaction of epoxides with acyl halides to afford the corresponding 2-haloalkyl esters[4,5]. This communication describes an efficient and a stereoselective synthesis of 2-haloalkyl esters from the reaction of epoxides and acyl halides catalyzed by a ZIF-8 [6].

An efficient and rapid procedure for ring opening reaction of various epoxides with Acyl halide derivatives was developed. The include can be obtained in at room temperature conditions in presence of ZIF-8 as nano catalyst.This catalyst can be reused several times without significant loss of activity. At first, we examined the reaction of cyclohexene oxide (la) with benzoyl chloride (2a) in Acetonitrile using a catalytic amount of ZIF-8 at room temperature for 20 min. Reaction conditions: epoxide (1.0 mmol), acyl halide (1.0 mmol), ZIF-8 (0.05 mmol) , acetonitrile (3.0mL), Isolated yield based on epoxide. without any side-reaction.The reaction proceeds smoothly to give trans-2-chlorocyclohexyl benzoate (3a) 92% yield as a sole product.

Keywords: Ring opening, epoxides, nano catalyst, ZIF-8.