Comparative Study of Niobium-containing Hexagonal Mesoporous Silicas Prepared Using Different Niobium Sources[1]

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Abstract—Two groups of niobium-containing hexagonal mesoporous silica (Nb-HMS) samples were prepared hydrothermally using niobium oxalate and niobium ethoxide as Nb source, respectively. The samples were characterized by XRD, N_2-adsorption, ICP-AES, UV-Vis, respectively. They were also evaluated by the epoxidation of cyclohexene with cumene hydroperoxide (CHP) as oxidant. It is revealed that the samples possess typical hexagonal mesoporous structure in which most of Nb species exist in the form of framework pentahedral coordinated state. Meanwhile, the Nb-HMS samples from niobium ethoxide give more excellent catalytic performance than those from niobium oxalate. It is likely because that the former samples have a higher total amount of Nb species and a higher proportion of isolated framework Nb species. Accordingly, niobium ethoxide is a better niobium source than niobium oxalate.

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