VAPOR-PHASE TRANSFER HYDROGENATION OVER METAL INCORPORATED MESOPOROUS ZEOLITES

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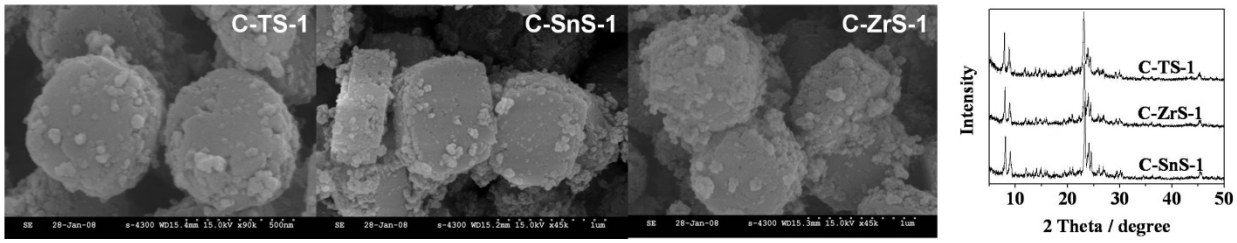
Metal incorporated nanoporous materials have shown emerging applications in green catalysis. Among them metal substituted zeolite beta and silicalite-1 have been an increasing interest due to their unique acidity could catalyze various type of reactions with almost 100 % selectivities. In this work, Ti, Zr and Sn were directly incorporated to the mesoporous silicalite-1 using carbon template synthesis (denoted to C-TiS-1, C-ZrS-1 and C-SnS-1 respectively) by microwave. All samples have shown MFI type crystal structure and uniform morphologies (Figure 1).



UV-vis spectra showed they had tetrahedral Ti, Zr and Sn species in the zeolitic framework. These metal species were proven to play roles as Lewis acid sites in hydrogen transfer reactions of ketones. These microwave synthesized mesoporous zeolite materials could activate ketones via transfer hydrogenation to the corresponding alcohols. Iso-propyl alcohol was used as a hydrogen donor and its ratio to ketones were lower as 1/4 than in the case of liquid phase reaction. Vapor phase hydrogenation was also found to be temperature dependant. The C-ZrS-1 gave the highest conversion comparing with C-SnS-1 and C-TS-1 at lower temperature 150 ℃. But over 250 ℃, all incorporated metal species could convert all ketones with almost 100 % selectivities.