In 2 % dosages. this material shows high

In the last few years, the invention ofa new group of mesoporous silicate or aluminosilicate molecular sieves, which iscalled M41S, has been receiving much attention in some areas of nanotechnology, chemical, engineering and physical sciences. M41S is broadly classified into fourmain categories including ordered hexagonal pore structure of MCM-41, cubic pore structure of MCM-48, lamellar of MCM-50and unstable molecular organic octomer. However, MCM-41is the most highly essential for scientists because it provides a lot of advantages.

First, MCM-41is absolutely tremendous because it is a good catalyst for some of the chemicalreactions, for examples dimerization–hydrogenation of ?-pinene (Zhang et al, 2017), oleic acid esterification (Wang and Yu, 2016) and phenol hydroxylationwith H2O2 (Zhang et al, 2010). The catalytic performanceof its material is especially related to the number of Bronsted acid sites andLewis acid sites on its surface. These sites arelike fabric because it is a place where the chemical reaction is conducted. The higher number of acidic sites is on the surface, the faster the chemicalreaction is. Zhang et al (2017) recently investigated the result of the introductionof palladium (Pd) and aluminum (Al) into MCM-41pores. By shaking MCM-41 with Pdand Al solution for 1 hour, finely dispersed Pd and Al species on the surfaceof MCM-41 were obtained whichexhibited strong Bronsted acid sites and Lewis acid sites. The catalytic activityof Pd-Al-MCM-41 was tested for theone-pot dimerization hydrogenation of ?-pinene at 140 oC with 2 % dosages.

This material shows high catalytic activity which is faster than the bulk Pd orAl catalyst and yields of the dimer is 63. 9 %. Moreover, the catalytic activityof its material is particularly associated with its owned thermal stability neededfor the high-temperature chemical reaction.

Qin et al (2016) observed that the additionof Ni into the MCM-41 structure resultedin the raising of thermal stability of MCM-41. The catalytic ability of the Ni-MCM-41for curmene cracking was observed giving the value of conversion rate of 54. 5%. Furthermore, the choosing of MCM-41as catalyst especially in pharmaceutical and agrochemical sciences for the finelychemical production and the building block synthesis is done largely due tooffering lots of benefits such as easy separation, simple recovery and easy eliminationfrom the hazardous chemistry.

Another useful of MCM-41 is an adsorbentmolecule that can be widely used for selective adsorption of many organic andinorganic pollutants from water. A number of studies have been exhibiting that theadsorption capacity of MCM-41 is not only affected by large pore volume, largesurface area and pore uniformity degree of MCM-41 but also by functional groupson the surface. Costa et al (2015) synthesized MCM-41 using tetraethylorthosilicate(TEOS) and surfactants mixture tetradecyltrimethylammonium bromide (TDMABr) andcetyltrimethylammonium bromide (CTABr). TDMABr-CTABr-MCM-41 was examined for CO2adsorption.

The value of adsorption capacity is 0. 62 g CO2/adsorbent. One of the members of M41S material, MCM-41 gives many advantages both good catalyst and adsorbent molecule. The numberof Bronsted acid sites, Lewis acid sites and functional groups on the surface, thermal stability, large pore volume, large surface area and pore uniformitydegree of MCM-41 are highly conducive for catalysis and adsorption.