Nano-Magnetite Supported Catalysts in Sustainable Organic Synthesis

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Introduction: Recently Nano-Magnetite supported catalysts[1-3] have been growing field in sustainable organic synthesis. These catalysts successfully employed in synthetic organic chemistry since they have the following characteristics

- High surface area
- Less reaction times
- Produce high yields and selectivity
- Very simple workup and reusable
- Easy to preparation and switch
- Low cost effect.

Nano-Magnetite catalysts are slowly emerging in multidisciplinary research includes biotechnology, biomedicine and catalysis[5-7] etc. Magnetite has a cubic inverse spinal assembly with space group of Fd3m. Magnetite nanoparticles one of the extensively studied materials in multidisciplinary research includes nanotechnology, biology, biochemistry and nano-chemistry etc.

Characterization: There are several characteristics to know the chemical and physical parameter like size, shape and surface of nano-magnetite catalysts.[7-10] Size of magnetite materials can characterize using transmission electron microscopy (TEM) and scanning electron microscopy (SEM). High resolution transmission electron microscopy (HR-TEM) is more advanced technique for structural morphology of a materials is < 1nm. Atomic force microscopy (AFM) useful to the surface feature and X-ray diffraction (ARD) technique useful to know crystalline phase, orientation, atomic arrangements and structural properties. X-ray fluorescence (XRF) technique is used to know the metal composition of a nano-magnetite material. To identify the nature, oxidation state and binding energy of the nano-magnetite material, X-ray photoelectron spectroscopy (XPS) is used.

Applications: Applications of nano-magnetite catalysts for the of C-C bond forming reactions, functional group transformations, synthesis of heterocyclic and carbocyclic molecules, biologically active molecules and natural products are documented in the literature[11,12] recently (Fig.1). Additionally, these catalysts are covering *via* linkers and ligands in asymmetric organic chemistry. Therefor there is much focus on nano-magnetite catalysts in synthetic organic chemistry in recent years.[13-15] These catalysts will play an important role in asymmetric synthesis and pharmaceutical chemical industries in near future.

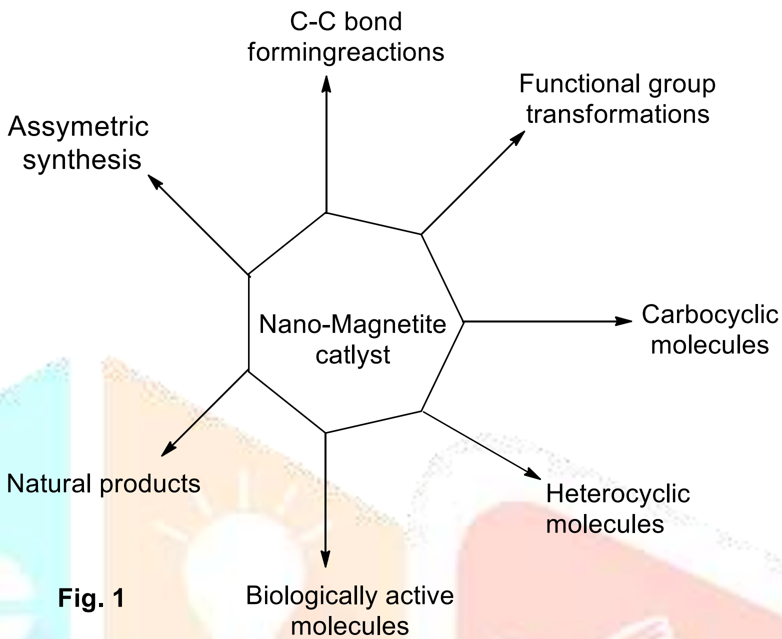

Fig. 1

Conclusions: Nano-Magnetite Catalysts were playing an important role in synthetic organic chemistry in recently. In future these catalysts will play a vital role in the chemical and pharmaceutical industry because of their high surface area will reduce the reaction time, increase the yields, increase the selectivity, reusable, easy to handle and low cost with simple workup process.

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