ABSTRACT

Metal-Organic Frameworks are crystalline compounds consisting of metal ions or clusters coordinated to often rigid organic molecules to form one, two, or three-dimensional structures that can be porous. In some cases, the pores are stable to elimination of the guest molecules (often solvents) and can be used for the storage of gases such as hydrogen and carbon dioxide. 2, 6 bis-(hydroxymethyl)-4-methylphenol monomer serve as Ligand was coordinated with different transition metals (Mn, Fe, Gd, Pr, La, Ce, Sm, Cu , Ni, Cd etc) to obtain metal-organic frameworks without and with the help of nitrogen containing Co-Ligands. Calixaren synthesized as being new type macro-cyclic molecules. Monomers of 2,6-bis-(hydroxymethyl)-4-methylphenol and 4-*tert*.butyl-2,6-bis(hydroxymethyl)phenol were synthesized through various methods. Azacalixarene were obtained by refluxing in Xylene when reaction proceeded with nitrogen containing compounds, monomers and metals, a few Metal-Organic Complexes were obtained and some did not give appropriate crystals.