

Synthesis and characterization of Eu³⁺-doped MCM-41

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MCM-41 has a mesoporous silicate structure which was discovered in 1990s. A surfactant template is used to reach the MCM-41. The mesoporous material could be achieved by template removal from nanochannels as synthesized sample. MCM-41 has unique properties such as high surface area, narrow pore size distribution, tunable and accessible pores. It has been a focus for several research areas like nanoscience, catalysis, environmental purification, adsorption and drug delivery [1,2].

MCM-41:Eu³⁺ mesoporous composite was prepared under hydrothermal condition using 27 % SiO₂, 14 % NaOH as silica and CTMABr as surfactant and Eu(NO₃)₃ as activator. XRD powder diffraction was used to structural characterization (Figure). PL spectrometry was used to photoluminescent properties of MCM-41:Eu³⁺. The overall local environment of Eu³⁺ ion in the MCM-41 was investigated by Fourier-transform infrared. The Eu³⁺ ions were tetrahedrally or distorted tetrahedrally coordinated by oxygen ions. The catalytic activity of the sample was tested by the hydrogenation reactions.

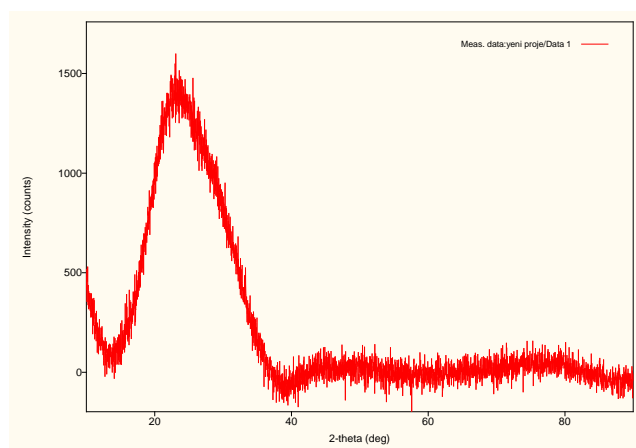


Figure. XRD pattern of MCM-41:Eu³⁺

References:

- [1] C.T. Kresge, M.E. Leonowicz, W.J. Roth, J.C. Vartuli, J.S. Beck, Nature 359 (1992) 710.
- [2] J.S. Beck, J.C. Vartuli, W.J. Roth, M.E. Leonowicz, C.T. Kresge, K.D. Schmitt, C.T. Chu, D.H. Olson, E.W. Sheppard, S.B. McCullen, J.B. Higgins, J.L. Schlenker, J. Am. Chem. Soc. 114 (1992) 10834.