PW heteropoly acid supported on Al, Ti, Zr-MCM-41 mesoporous materials: preparation and characterisation

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The class of MCM-41 materials has been widely studied, because of its pseudo-crystalline and textural properties, such as the hexagonal arrangement mean pore diameters in the range of 20–100 Å and high surface area s (>1000 m^2/g).

In general, the structural and textural characteristics of such molecular sieves are directly related to the synthesis conditions under which they are prepared: the nature of the surfactant, pH, presence of electrolytes, temperature, solvents, aging/preparation time, etc. On the other hand, the incorporation of heteroatoms in the MCM-41 structure, transition metals or Al, promotes the appearance of active catalytic sites (both acid or redox), which may suit them for interesting applications in heterogeneous catalysis such as hydrocarbon catalytic cracking, isomerization, hydrodesulphurization, oxidation reactions, hydroxylation and epoxidation of aromatics, olefins and phenols, etc. In addition, MCM-41 material is an excellent support for acid catalysts like heteropoly anions, allowing a better dispersion of the active phase.

The aim of the current research is the synthesis of MCM-41 modified with Al, Ti or Zr. The tungsten heteropolyacid were dispersed on Al, Ti, Zr-MCM-41 using the impregnation method improving its oxidation potentials.

Characterization of materials has been made by means of X-ray diffraction, N_2 adsorption, ^{29}Si CP MAS NMR and Transmission Electron Microscopy.

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