



PHOTOCATALYTIC DEGRADATION OF MECOPROP BY USING MCM-41 MODIFIED WITH FLUOROPORPHYRIN COMPLEX

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The immobilization of the porphyrin into solids, such as the solid support MCM-41, can have a marked influence on its chemistry and photochemistry, including thermal and mechanical stability, and the local reaction environment. The preparation of a MCM-41 (channel diameter varied between 26.1 and 36.5 Å) modified with a porphyrin is reported along with an investigation on its photocatalytic behavior compared with bare MCM-41.

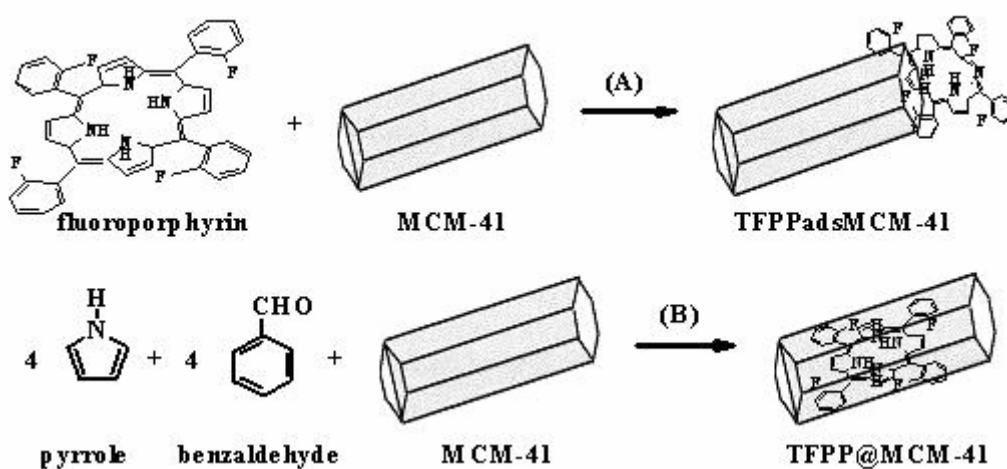
Two different strategies for immobilization have been explored, the first based on the cage size effect (route A) and the second involving template synthesis (route B).

Route A is based on the diffusion of porphyrin into a previously calcinated MCM-41 sample. The porphyrin needs to be sufficiently stable during the adsorption process, which is carried out at room temperature. Route B involves the synthesis of the porphyrin inside the support through precursors (scheme 1).

The synthesized materials were characterized by standard physical techniques, such as elemental analysis, diffuse reflectance spectroscopy, TG-DTG, fluorescence and N₂ adsorption at 77 K.

The porphyrin complex alone did not show any beneficial influence on the photoactivity because of its photodegradation under light excitation at 366 nm, during the reaction time. A tentative explanation of the beneficial effect due to the presence of MCM-41 support both on the reaction rate and on the mineralization process is provided by taking into account intrinsic electronic and physico-chemical properties.

These hybrid materials proved to be good photosensitizers [1] and will continue to be tested in photodegradation reactions of others pesticides, under controlled pH, and with and without oxygen atmosphere.



Scheme 1. Strategies applied in the syntheses of modified MCM-41.

[1]. H.D. Burrows, M.Canle, J.A. Santaballa, S. Steenken, J. Photochem. and Photobiol. B: Biology **67** (2002) 71-108.