

## Mesoporous Materials with a Hierarchic Pore System by Means of Biomimetics Preparatory Approaches

**Jamal El Haskouri\***, Victoria Puchol Estors, Daniel Beltrán and Pedro Amorós

*Institut de Ciència dels Materials (ICMUV), Universitat de València, P. O. Box 2085, 46071-València, Spain FAX: +34 963543633  
E-mail: [haskouri@uv.es](mailto:haskouri@uv.es)*

### **Abstract:**

Ever since the researches of MOBIL reported the discovery of the family M41S (MCM-41 Hexagonal, MCM-50 Lamellar, MCM-48 cubic) many strategies of synthesis for this type of family have been described<sup>1,2</sup>. In addition, the investigators in the world of the nanotechnology have arrived a little far to not only look for other methods of synthesis for this family but to prepare other new phases with a distinct pore distribution and a nanometric particle size<sup>3-8</sup>.

Mesoporous Nanomaterials based on silica with a hierarchic pore system has been elaborated by means of a preparatory strategy that is based on a biomimetic approach<sup>5</sup>. These nanoparticles have been synthesized in neutral silica dissolutions to pH and in the presence of amines and polyamines of different chains. These new nanomaterials have been characterized with several techniques like X-rays RX, Nitrogen Adsorption Desorption, Electronic Microscopy of Transmission TEM, Electronic Microscopy of Sweeping SEM, ATG, Infrared IR and Elementary Analysis CHN.

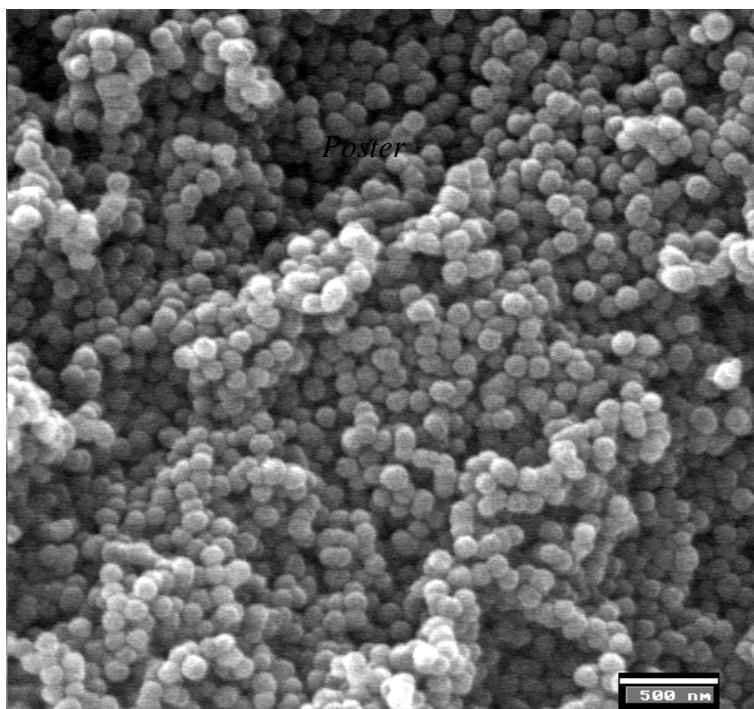
**Keywords:** Mobil Company, M41S Family, Biomimetic, Nanomaterials.

### **References:**

- 1- C. T. Kresge, M. E. Leonowicz, W. J. Roth, J. C. Vartuli, J. S. Beck, *Nature* **1992**, *358*, **710**.
- 2- Amorós del Toro José, Beltrán Porter Aurelio, Beltrán Porter Daniel, Cabrera Medina Saúl, El Haskouri Jamal, Marcos Martínez M. Dolores. Patente **WO 01/72635 A1, 2001.**, S. Cabrera, J. El Haskouri, C, Guillem, J. Latorre, A. Beltrán, D. Beltrán, M. D. Marcos and P. Amorós. *Generalised Syntheses of Ordered Mesoporous Oxides: The Atrane Route*, Solid State Science, (2000): **2**, **405**.

- 3- T. Linssen, K. Cassiers, P. Cool, E. F. Vansant, *Adv. Coll. Inter. Science* **2003**, *103*, 121.
- 4- G. J. A. A. Soler-Illia, C. Sanchez, B. Lebeau, J. Patarin, *Chem. Rev.* **2002**, *102*, 4093.
- 5- M. E. Davis, *Nature* **2002**, *417*, 813.
- 6- A. Stein, *Adv. Mater.* **2003**, *15*, 763.
- 7- J. N. Cha, K. Shimizu, Y. Zhou, S. C. Christiansen, B. F. Chmelka, G. D. Stucky, D. Morse, *Proc. Natl. Acad. Sci. USA* **1999**, *96*, 361.
- 8- F. Noll, M. Sumper, N. Hampp *Nano Letters* **2002**, *2*, 91.

**Figures:**



*Images of SEM of nanoparticles of silica obtained from approximations biomimetic*