Supramolecular Entities Based on Molecular Sieves for Catalysis and Synthesis of New Materials

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Summary

Micro and mesoporous molecular sieves with inorganic or organic-inorganic walls can be synthesized through a self assembling process between the constituents of the walls and organic structure directing agent molecules (OSDA). The role of the OSDA is to order the walls around them. The chemical composition of the OSDA, i.e., polarity and strain, that will control the self assembling process, will be presented together with the directing effect of the framework atoms.

By using the above concepts it is possible to prepare hybrid organic-inorganic molecular sieves by one or two step synthesis, leading into mesoporous PMO and micro and mesoporous metal organic frameworks (MOFs) with giant pores.

Will show how the proper design of the porous materials opens new possibilities for gas separation/storage, and catalysis. Moreover, the formation of supramolecular entities based on those materials, present outstanding properties for magnetism, photocatalysis, chemical sensors, light emitting devices, molecular machines, etc.

Profesor Avelino Corma Canos (1951)

studied chemistry at the Universidad de Valencia (1967-1973), and received his Ph.D. at the Universidad Complutense de Madrid in 1976. He was a Postdoctoral Fellow in the Department of Chemical Engineering at the Queen's University (Canada, 1977-79). Since 1990 he has been director of the Instituto de Tecnología Química (UPV-CSIC) at the Universidad Politécnica de Valencia.

Professor Corma is widely recognized as a prolific and versatile contributor to the science and technology of materials and heterogeneous catalysis. His research covers a broad field of basic aspects of tailored synthesis of porous solid oxides, their structure characterization and reactivity in acid-base and redox catalysis with emphasis on the development of new advanced catalysts. In applications, he has particularly contributed to the discovery and commercialization of new catalysts for the isomerization of light naphtha. Other achievements include development of large-pore zeolitic material containing titanium with unprecedented selectivity and stability for the selective epoxidation of propylene, design of basic solid catalysts for selective isomerization of α-olefins, synthesis of tin-containing zeolites for selective oxidations, the innovative use of germanium to synthesize new zeolite structures and many others.

Professor Corma is co-author of about 500 articles and 100 patents on these subjects, author of a number of reviews and book chapters. He acts as a member of Editorial Boards of the most important journals in the field of catalysis, physical chemistry, and material chemistry.

His achievements in material synthesis and catalysis have been recognized by a number of highly prestigious awards. He has received the Dupont Award on New Materials (1995), the Spanish National Award "Leonardo Torres Quevedo" on Science and Technology (1995), the "Premio Iberdrola de Química" (1998) the F. Ciapetta Award of the North American Catalysis Society (1998), the Ipatieff Lecturer Award at the Northwestern University 2000/01, the "Rey Jaime I." Award on New Technologies (2000), the François Gault Lectureship of the European Federation of Catalysis Societies (2001), the Eugene J. Houdry Award in Applied Catalysis of the North American Catalysis Society (2002 - the first European to receive such an accolade), the Breck Award of the International Zeolite Association (2004).