Simposio Internacional / International Symposium:

Materiales mesoporosos: de 1991 a 2018

Mesoporous materials: from 1991 to 2018

Madrid, 10 y 11 de abril de 2018 / April 10 and 11, 2018

ABSTRACT

Mesoporous Crystals: Looking through scattering, diffraction and imaging

Osamu Terasaki
School of Physical Science and Technology (SPST), ShanghiTech University, China

Silica mesoporous crystals (MSCs) are formed through the cooperative assembly of surfactants and water-soluble species into meso-structured domains followed by successive calcination of organic-inorganic composites .The structural analyses of SMCs are of great interest because of their potential for new applications in adsorption, catalysis, sensor design, drug delivery, tissue engineering and nanotechnology.

As SMCs belong to a new class of crystals with mesoscale rather than atomic order, a new methodological development based on crystallography was required by paying attentions to the facts that (i) the amorphous silica walls and pores are arranged periodically and show beautiful crystal morphology, which is commensurate with their point group symmetry, and (ii) dynamical scattering of electrons prevents observing proper extinction conditions of SMCs from the selected area electron diffraction patterns. So our approach was to obtain not only extinction conditions but also magnitudes of crystal structure factors both amplitudes and phases through Fourier transformation from selecting a very thin area of the HRTEM images, and to construct 3D-electrostatic potential maps uniquely.

We have solved various structures by this approach. At the meeting I will discuss following points without touching upon the formation mechanism; (i) observed fine structures of the porous system, such as the pore geometry, the nature of the wall, defects and intergrowth, and (ii) structure descriptions using a few geometrical parameters.

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