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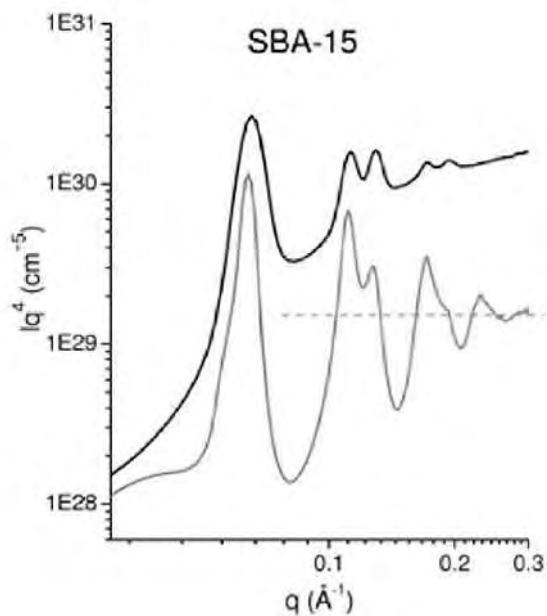
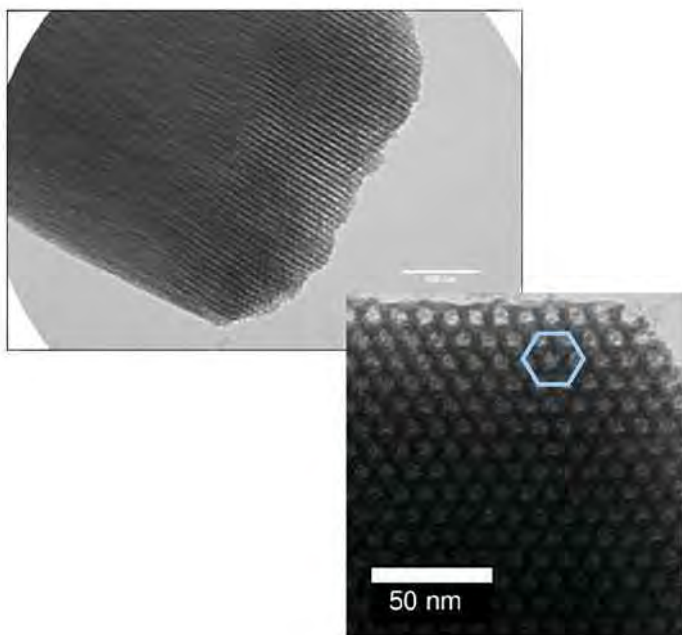
Measuring the specific surface area of mesoporous silica using x-ray scattering

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The development of porous silica or carbon material with high specific surface area raises a high interest in the field of materials science given their potential interest in a wide range of applications including catalysis, water treatment or drug delivery. Among these mesoporous structures, those consisting of one-dimensional pores aligned along a compact hexagonal packing are of prime importance and can be referred to as "hexagonal mesoporous materials" (HMPM). The most famous silica structures of this kind are MCM-41 and SBA-15. The same symmetry can be found in carbon mesoporous materials, for example in FDU-15 structures. The precise characterization of HMPM is necessary for most of the applications envisioned for these materials (pore size, pore density, specific surface and sometimes thickness of the functionalization layer). Small angle X-ray scattering techniques offer the opportunity to determine the mean structural parameters of HMPM. Although different approaches can be found in the literature in order to numerically reproduce the experimental data obtained on HMPM or hexagonal liquid crystals, when the sample is a powder, fitting the experimental data in absolute scale with numerical models becomes necessary. However, with a large scattering contribution of grain at low q vector as well as short range correlation contribution at large q , the analysis is not so simple. In this paper, we propose a comprehensive study [1] devoted to the quantitative interpretation of small-angle scattering patterns of HMPM in terms of structure and specific surface estimation based on the formalism proposed by Spalla et al. [2]. In the case of two real samples, namely a SBA-15 and a MCM-41 powder, the specific surface area of the mesopores is estimated and is discussed in the light of gas adsorption measurements.

[1] J. Cambedouzou and O. Diat, *J. Appl. Cryst.* 2012, 45, 662-673, [2] O. Spalla, S. Lyonnard and F. Testard, *J. Appl. Cryst.* 2003, 36, 338-347



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