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Assessment of the Specific Surface Area by Small-Angle X-ray Scattering

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The reliable measurement of the specific surface area of many modern materials –porous or non-porous –is of vital importance both in research and industry. To date, the most commonly used method for the determination of the specific surface area of any material is based on the BET (Brunauer-Emmet-Teller) method that relies on the physisorption of gas molecules at the sample surface. The BET method has a number of limitations and challenges, e. g., time-consuming sample preparation/measurement and that the size and effective cross-section of the adsorptive molecules that cover the sample surface is not always known. Small-angle X-ray scattering (SAXS) has good potential to overcome these limitations [1].

In this contribution we will present SAXS as an alternative and complimentary approach for reliable and fast surface area assessment and compare it to the established BET method, showing data for both dense nanoparticle systems as well as highly porous MOF/COF structures.

References:

1. C. Schlumberger, C. Scherdel, M. Kriesten, P. Leicht, A. Keilbach, H. Ehmman, P. Kotnik, G. Reichenauer, M. Thommes, Reliable surface area determination of powders and meso/macroporous materials: Small-angle X-ray scattering and gas physisorption, *Microporous and Mesoporous Materials* 329 (2022) 111554.

Primary author: KEILBACH, Andreas (Anton Paar GmbH)

Co-authors: Dr MOSER, Armin (Anton Paar GmbH); Dr EHMANN, Heike (Anton Paar GmbH)

Presenter: KEILBACH, Andreas (Anton Paar GmbH)

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