Quantitative pore analysis using small angle scattering for secondary battery electrode

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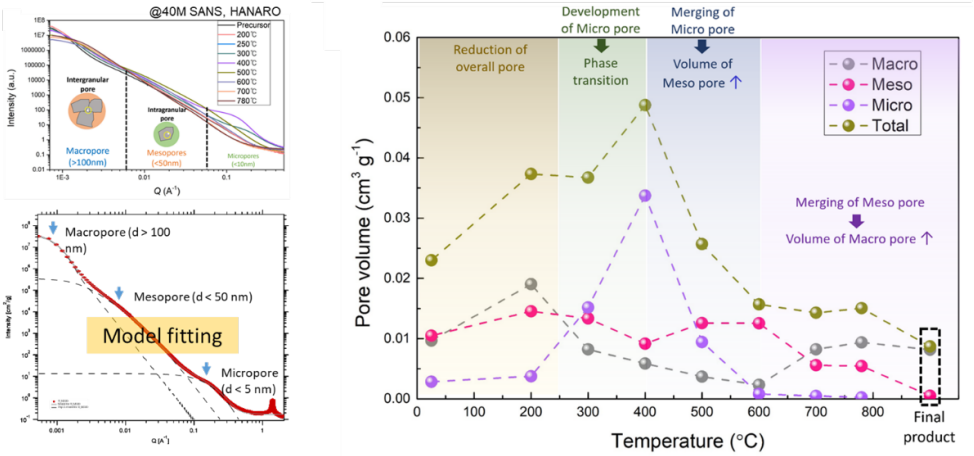
Small Angle Scattering (SAS) is a non-destructive technique used to analyze compositional or density heterogeneities in samples, ranging in size from 1 to 300 nm, by observing scattering patterns in the small-angle region produced as X-rays or neutrons pass through the sample. This method provides information on the statistical nanostructure within a large volume traversed by the beam, allowing for the analysis of all pores, including closed pores within the sample. Notably, the technique enables quantitative analysis, including pore size distribution and total porosity, through proper absolute calibration of the scattering intensity. Therefore, SAS is highly suitable for analyzing nanoscale pores within samples. In this study, we present research findings on the quantitative analysis of pores in various energy materials, including mesoporous carbon nanofibers, using complementary Small Angle X-ray Scattering (SAXS) and Small Angle Neutron Scattering (SANS) techniques [1-2].

[1] Adv. Funct. Mater. 34(3), 2306654 (2024).



Quantitative nanopore analysis by small angle scattering.