

## **Molecular packing in double gyroid cubic phases revealed via resonant soft X-ray scattering**

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The bicontinuous double gyroid phase is one of the nature's most symmetric and complex structures, the electron density map of which was established long ago. By utilizing small-angle X-ray scattering (SAXS), resonant soft X-ray scattering (RSOXS) at the carbon K-edge and model-dependent tensor based scattering theory, we have not only elucidated morphology but also identified molecular packing in the double gyroid phases formed by molecules with different shapes, i.e. rod-like vs taper-shaped, thus validating some of the hypothetical packing models and disproving others. The spatial variation of molecular orientation through the channel junctions in the double gyroid phase can be either continuous in the case of anisotropic channels or discontinuous in the case of isotropic channels depending on the molecular structure and shape.

\*main ref: Yu Cao, Mohamed Alaasar, Asritha Nallapaneni, Mirosław Salamończyk, Peter Marinko, Ewa Gorecka, Carsten Tschierske, Feng Liu, Nataša Vaupotič, Chenhui Zhu, *Phys. Rev. Lett.* 125, 027801 (2020)

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