**Insights into internal magnetic structure of iron oxide nanoparticles: a combined small-angle neutron scattering and magnetometry study**

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This work continues our previous studies on iron oxide nanoparticles [1] to systematically investigate the magnetic structure of the nanoparticles in a broad range of particle sizes. The parameters of the core-shell structure were determined using small-angle neutron and X-ray scattering. A non-magnetic layer at the nanoparticle surface was determined using small-angle scattering with polarized neutrons at saturating fields. Room temperature hysteresis data was obtained using vibrating sample magnetometry and the *M*(*H*) curves were inverted to obtain the magnetic moment distribution within the nanoparticle systems.

The detailed magnetic structure of the nanoparticles is obtained by analyzing the results on the non-magnetic layer, the size distribution and magnetic moment distribution.

[1] T. Köhler et al., Nanoscale, **13**, 6965 (2021).

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