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【805】 Direct investigation of microstructure and magnetism of individual cobalt nanoparticles

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Enhanced magnetism in 3d transition metal nanoparticles is of great interest for applications and for our fundamental understanding of nanomagnetism. However, despite considerable research efforts, the origin of anomalous magnetic properties in nanoparticles, such as enhanced magnetic anisotropy, are still poorly understood. Here, we combine X-ray photo-emission electron microscopy (X-PEEM) with high-angle annular dark-field scanning transmission electron microscopy (HAADF-STEM) in order to correlate magnetism and microstructure of individual nanoparticles. Our data suggest that the magnetism of cobalt nanoparticles is determined by competing shape, surface, and structural contributions. Further, we find that this competition can easily mask the commonly expected size dependence of nanoparticles magnetic properties such as magnetic energy barriers.

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