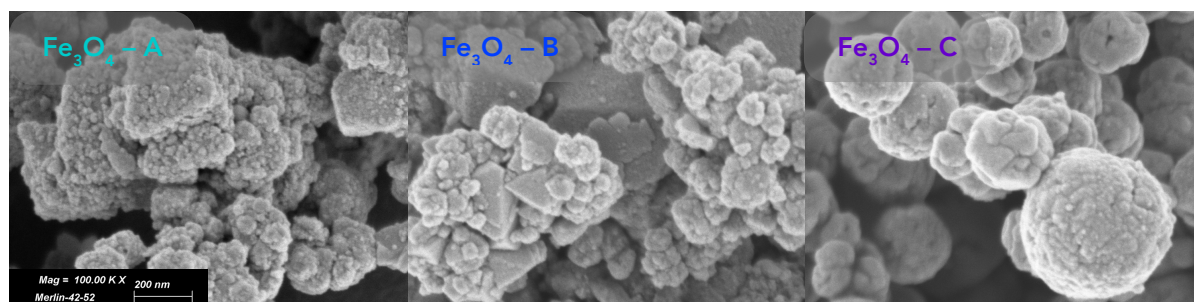
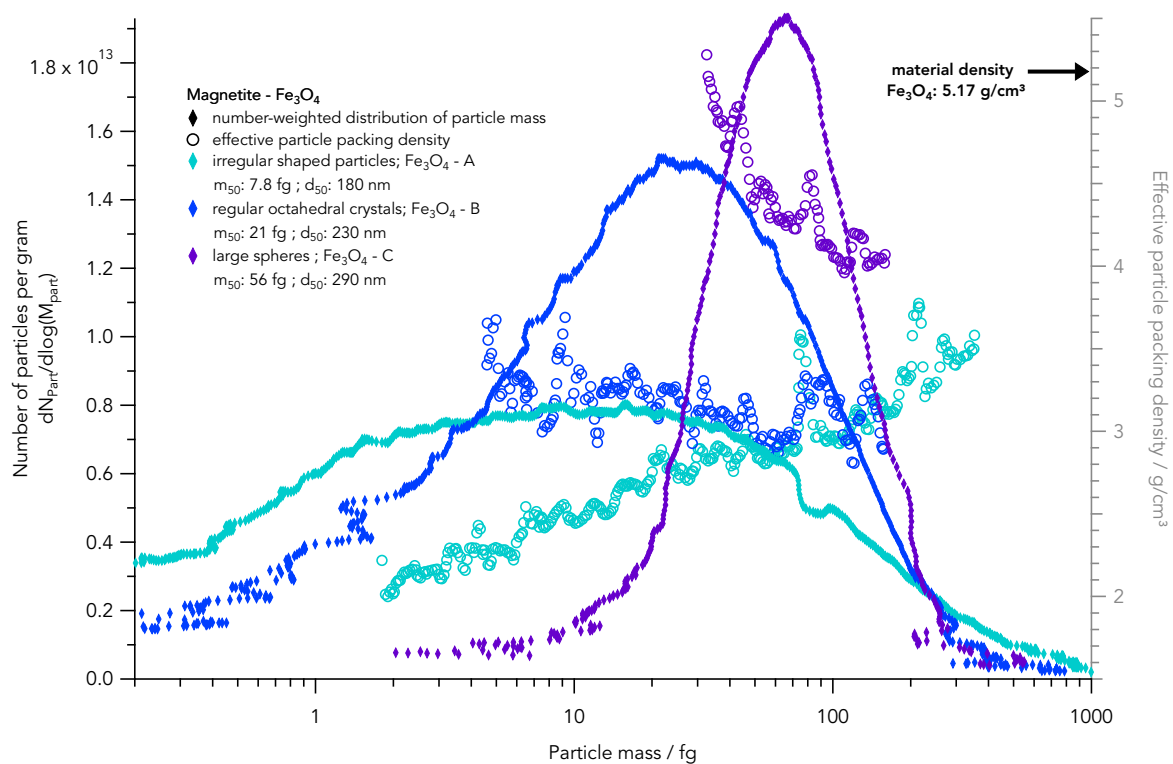


Characterizing Magnetic Particles

Fe₃O₄ – C.I. pigment black 11

Measuring the size of magnetite particles (Fe₃O₄; pigment black 11) is challenging. Dispersed particles tend to reaggregate quickly due to their magnetic properties. The particle shape varies from irregular-shaped and porous structures (A) over regular octahedral crystals (B) to large spherical particles (C). With that, the effective particle packing density varies greatly. Those properties do not only differ from sample to sample but also change within one product. Combined with reagglomerating particle in liquid suspensions, particle size analysis by traditional sedimentation methods, laser-diffraction or dynamic light scattering become very limited.



APPLICATION NOTE

The PowMaster system avoids these limitations:

- Aerosolizing particles in air prevents reagglomeration due to the considerable distances ($\sim 100 \mu\text{m}$) between particles
- The particle packing density is measured and provides valuable information to describe the particle structure. For example, in sample [Fe₃O₄ – B](#) small particles are more porous than large particles, which is an unusual feature.
- Particle mass (femtogram, 10^{-15} g) is a measurement unit independent of the shape, chemical composition and refractive index.