



## Characterization of precipitates in electrical steels using Neutron small-angle scattering

Swerim is a Swedish leading industrial research institute within mining engineering, process metallurgy, materials, manufacturing engineering and applications. Swerim connects need-based industrial research with partners, gives industry insights of the latest findings, and the possibility of developing business ideas for sustainable growth.

Within the above framework, Swerim has been working with electrical steel producers to improve the strength of electrical via precipitate hardening. Precipitates smaller than 15 nm can improve the mechanical properties of electrical steel without detreating the magnetic properties. Such small precipitates cannot be characterized using conventional laboratory methods with great statics.



The [applied material analytics](#) of ANAXAM using [Neutron Small-Angle Scattering](#) helps to understand the influence of concentration, size, and type of precipitates on the magnetic and mechanical properties of the non-oriented

electrical steels that are used for high efficiency electrical motors.

For this customer project, ANAXAM used the SANS-1 beamline at the Paul Scherrer Institute.

“ Neutron scattering enables characterizing nanoparticles, with great statics that is beyond laboratory methods. This new insight will help understanding and improving sustainable materials with great performance.”

Dr. Shirin Nouhi, researcher and project manager,  
– Swerim AB

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