



	Experiment title: Kinetics of cluster formation at metal oxide interfaces	Experiment number: SI 1153
Beamline: ID10A	Date of experiment: from: 29.06.2005 to: 05.07.2005	Date of report:
Shifts: 18	Local contact(s): Dr. Federico Zontone	<i>Received at ESRF:</i>
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Report:

The results from our experiment on iron thin film on MgO substrate “Morphology of Fe/MgO(001) ultrathin films“ have been published under:

R. Reitinger, B. Sepiol, G. Vogl, B. Pfau, L.-M. Stadler, S. Stankov, F. Zontone, N. Spiridis, and J. Korecki, Journal of Appl. Phys. **102**, 034310 (2007).

We enclose the abstract of this publication:

The structural and magnetic properties of iron clusters resulting from the evaporation of five monolayers of iron on a polished MgO(001) substrate are examined by grazing-incidence small-angle X-ray scattering, and conversion electron Mössbauer spectroscopy. Volmer-Weber-growth is observed for room-temperature deposition, giving rise to spherical, superparamagnetic islands. Subsequent annealing causes coarsening and the particles become hemispherical (see Fig. 1). In the early stages of annealing cluster diffusion takes place, whereas later, Ostwald ripening is the dominant coarsening mechanism. The diffusion coefficient is independent from the crystallographic directions in the MgO(001) surface as it is proven by the isotropic island distribution and shape. The superparamagnetic state of the particles is conserved during the whole annealing process. For ultrathin iron layers we show that, in contrast to bulk iron, the Curie temperature lies well below room temperature.

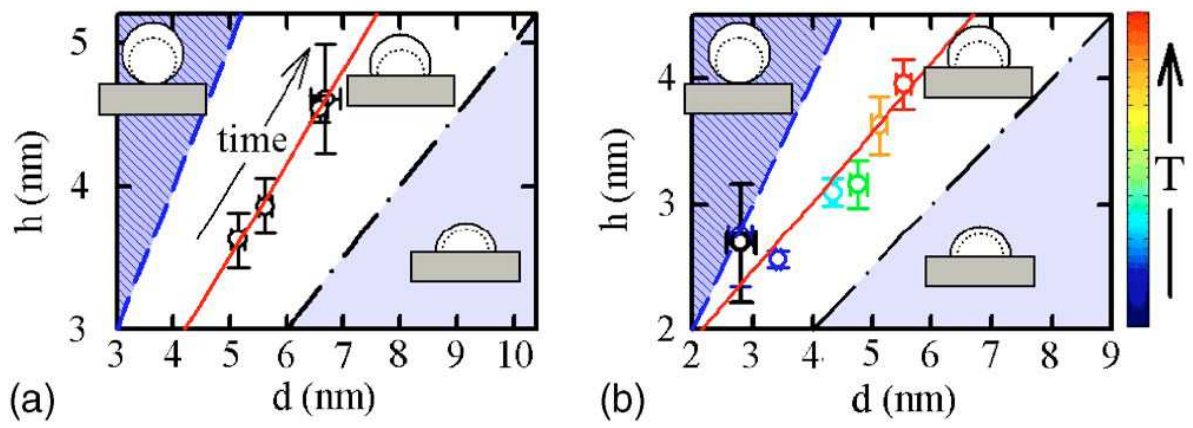


Fig. 1. Height h of the islands in relation to the diameter d of the islands. On the left side the time dependence at 550°C, on the right side the temperature dependence between RT and 550°C. Lower black line (dash-dotted) marks the positions with perfect hemispheres, upper blue line refers to full spherical islands.