ESRF	**Experiment title:** Iron diffusion in an a-oriented FePt-structure	**Experiment number**: HE 2754
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Report:

The results from our experiment on a-oriented FePt "Iron self-diffusion in $L1_0$-ordered FePt thin films**"** are prepared for publication. We enclose the abstract of the submitted paper:

We report a complete survey of iron self diffusion in $L1_0$-ordered FePt thin film. Using grazing incidence nuclear resonant scattering we studied iron diffusion in isotopic multilayers, $[^{57}FePt/^{nat}FePt]_{10}/MgO(100)$ prepared by molecular beam epitaxy. The appropriately selected orientations of MgO substrates enabled determination of iron diffusivities along main axes of tetragonally ordered FePt structure (see Fig. 1). Diffusivity was measured via annealing of the isotopic multilayers at temperatures between 653 K and 743 K and following the decay of the superstructure Bragg peak intensities. A ratio of approximately 15 of diffusion coefficients for iron atoms diffusing parallel to the *c*-axes and in the *a*-plane can be explained by highly correlated, i.e. less efficient jumps of iron between the layers of the $L1_0$-ordered structure.

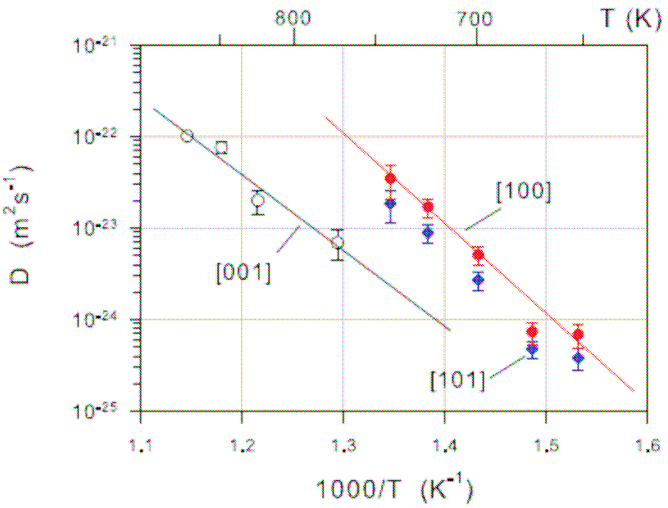

Fig. 1. Arrhenius plot for iron diffusion along the *c*-axis of the $L1_0$-structure ([001] direction, open circles), along the [101] oriented structure (blue solid circles) and for diffusion parallel to the *a*-plane ([100] direction, red solid circles). The solid lines are fits to the data.