



	<b>Experiment title:</b> Determination of Point Defect Concentrations in Nano-crystalline Pt	<b>Experiment number:</b> MA 1285
<b>Beamline:</b> BM 20	<b>Date of experiment:</b> from: 18.02.2011 to: 22.02.2011	<b>Date of report:</b>
<b>Shifts:</b> 12	<b>Local contact(s):</b> Carsten Baetz	<i>Received at ESRF:</i>
<b>Names and affiliations of applicants</b> (* indicates experimentalists): W. Gruber <sup>1*</sup> , H. Schmidt <sup>1*</sup> , C. Baetz <sup>2*</sup> <sup>1</sup> Technische Universität Clausthal, Germany <sup>2</sup> Helmholtz-Zentrum Dresden-Rossendorf, Germany		

Synchrotron based combined in-situ X-ray diffractometry and reflectometry is used to investigate the role of vacancies for the relaxation of residual stress in thin metallic Pt films. From the experimentally determined relative changes of the lattice parameter,  $a$ , and of the film thickness,  $L$ , the modification of vacancy concentration and residual strain was derived as a function of annealing time at 130 °C. The results indicate that relaxation of strain resulting from compressive stress is accompanied by the creation of vacancies at the free film surface. This proves experimentally the postulated dominant role of vacancies for stress relaxation in thin metal films close to room temperature.

More details can be found in:

W. Gruber, S. Chakravarty, C. Baetz, W. Leitenberger, M. Bruns, A. Kobler, C. Kübel, H. Schmidt, *Strain Relaxation and Vacancy Creation in Thin Platinum Films*, Physical Review Letters 107 (2011), 265501.