

### **Diffuse Scattering of Pt-Rh in Grazing Incidence**

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The near-surface microstructure of Pt-47 at.% Rh was investigated by diffuse scattering under grazing incidence at 730°C and UHV condition. The (110) and (111) surfaces investigated had a crystallographic misorientation of less than 0.05°. The samples were polished, then sputtered and aged prior to the diffraction experiments done at the Materials Science Beamline 4S of the SLS. The incident angle was 0.7 or 0.9 times the critical angle for total reflection. Thus, a depth of 2 and 3 nm, respectively, of the top-layers was probed.

For the bulk microstructure, no long-range order has been experimentally established in Pt-Rh owing to small interactions and sluggish kinetics. Only recently, weak diffuse maxima were found at  $1 \frac{1}{2} 0$  positions. For the near-surface microstructure, typically 600 positions were measured, with about 500 counts in 200 s. After calibration and subtraction of the inelastic scattering contributions, the remaining elastic scattering was decomposed into short-range order scattering, size-effect scattering, and Huang scattering. Local order was revealed for both surfaces, but there were differences, too. For the (110) surface, the diffuse maxima were located at  $1 \frac{1}{2} 0$  positions as for the bulk microstructure, for the (111) surface they were at  $\frac{1}{2} \frac{1}{2} \frac{1}{2}$  positions. In the evaluation, surface segregation was considered negligible, an assumption that seemed justified in view of the measured and calculated segregation profiles.

**Keywords:** grazing incidence diffraction, alloys, short-range order