Scanning Electron Microscopy and EDX microstructure analysis

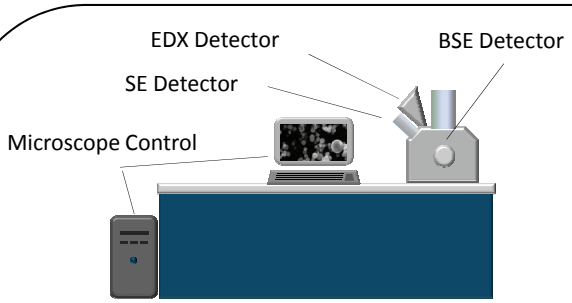


Fig. 1: SEM schematic

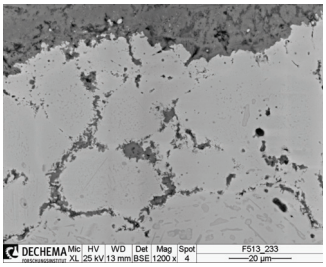


Fig. 2: BSE image showing element contrast for different atomic mass on a cross section

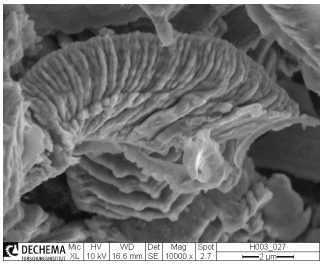


Fig. 3: SE image highlighting the surface structure of a sample

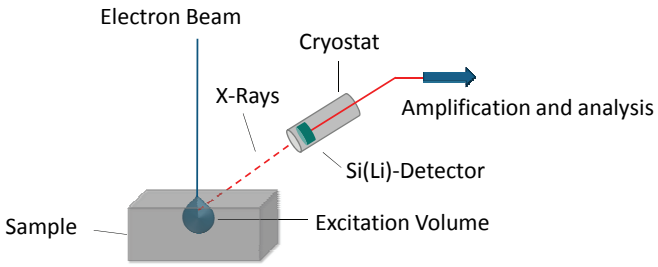


Fig. 4: Schematic energy dispersive spectrometer

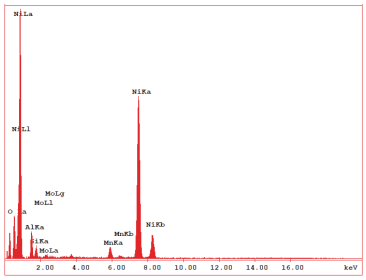


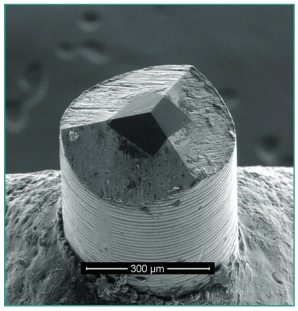
Fig. 5: Energy dispersive spectrum

The energy dispersive spectrum is generated by X-Rays leaving the excitation volume of the sample, absorbed by the Si(Li)-Detector.

The Spectrum is used for qualitive and quantitative analysis of the sample

Nanoindentation

Berkovich indenter [θ=65.27°]

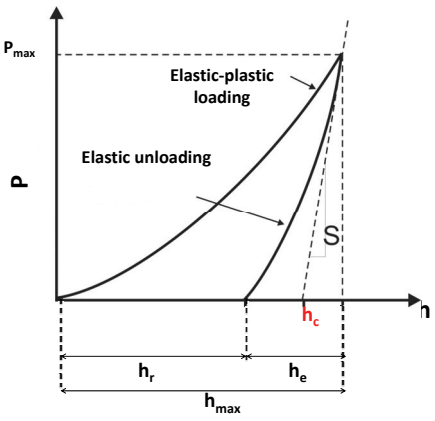


[University of Nebraska-Lincoln]

$$A = 3\sqrt{3} * h_c^2 * \tan^2\theta \approx 24.5\, h_c^2$$

$$H = \frac{P}{A} = \frac{P}{24.5\, h_c^2}$$

Load (P) – displacement (h) curve



[K. Durst & M. Göken; Uni. Erlangen-Nürnberg]

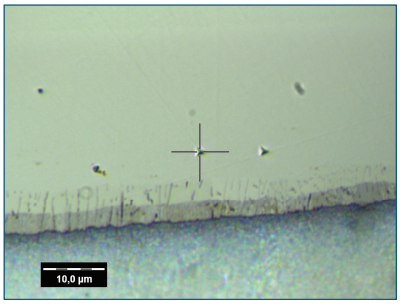
h_{max}: depth from original specimen surface at load P_{max}

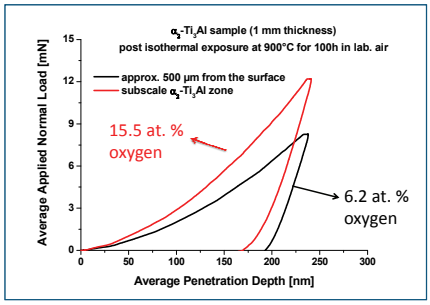
h_r : depth of the residual impression

h_e : elastic displacement during unloading

h_c : contact depth of penetration

Precise point indentations to correlate the hardness with O-concentration in a pre-oxidized α_2-Ti_3Al sample





Correlation of reduced modulus with Al-concentration for aluminide coatings after thermocyclic oxidation