

# Study of the channeling effect over the EDS signal observed in the complex system $\text{Nb}_{16}\text{W}_{18}\text{O}_{94}$ using HAADF-STEM technique.

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In crystalline samples the channeling effect must be considered for the fast electrons along the crystalline species. In the present work we studied channeling effect on EDS signal using HAADF-STEM conditions. We use the tendency of the probe to focus along the atomic columns in HAADF conditions to know the channeling effect and the effect on the EDS signal. The channeling effect produced in a HAADF-STEM experiment depends on the orientation of the atomic columns with respect to the incident beam. In the complex system  $\text{Nb}_{16}\text{W}_{18}\text{O}_{94}$  the crystalline parameters are large enough to obtain visible channeling effects at [001] zone axis. The EDS signal at [001] zone axis is very small due to the channeling effect. As the sample tilt is slightly increased (less than 1 degree) the channeling effect diminishes and then the EDS signal increases because when we tilt the specimen, the beam spreads out the atoms in a column perpendicular to the optical axis, this reduces the cooperative beam focusing and reduces channeling. We obtained EDS signal from [001] zone axis to 1 degree tilted and the signal shows a considerable increase out of the [001] zone axis. In order to observe these effects, the electron microscope must be perfectly aligned. The experiment was performed in a 2010 JEM FasTem microscope at 200 keV.

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