

Diffraction Based Determination of Single Crystalline Elastic Constants on Polycrystalline Alloys

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The single crystalline elastic constants are essential for technical materials. For most of the engineering-alloys the fabrication of single-crystalline specimen is either difficult or even impossible and therefore the derivation of these constants is complicated.

Different diffraction techniques allow the investigation of poly-crystalline and multi-phase materials due to its outstanding possibility to visualize the different strains of all phases averaged over all orientations. This allows a type of reversal of the classical stress analysis with the single crystalline elastic constants as result. As proof of principle the results of one- and two-phase steels are presented. Additionally the single crystalline elastic constants for different single- and multi-phase Ti alloys are discussed.

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