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**High-Energy X-Ray Study of Short Range Order and Phase Transformations in Ti-V** INGO RAMSTEINER[1], ANDREAS SCHOEPS, HARALD REICHERT, HELMUT DOSCH, Max-Planck-Institute for Metals Research Stuttgart, Germany — Phase transformations, especially precipitation processes, are a key factor in alloy design. Understanding these processes in the framework of statistical thermodynamics requires knowledge about the atomic interaction potentials between the alloy constituents. Experimentally, these parameters can be accessed via the diffuse x-ray scattering caused by the configurational short range order and lattice distortions. We employ a bulk sensitive high energy technique to study both phenomena simultaneously in situ, probing macroscopic single crystals in transmission geometry. The data recorded by a 2D detector reveal Bragg reflections from the precipitates superimposed on the diffuse scattering of the matrix. We present a detailed study of bcc Ti-V, a typical titanium $\beta$-alloy. The diffuse scattering is mainly due to lattice distortions induced by the atomic size mismatch. Depending on the annealing temperature, growth and dissolution of hcp $\alpha$-Ti precipitates and minute fractions of TiC are observed. HRTEM experiments have been conducted to complement our results.

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