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Diffuse scattering due to nanoprecipitation in Ni-Al-Si alloys ROZALIYA BARABASH, G. ICE, E. SPECHT, ORNL Oak Ridge TN, P. ZSHACK, APS Argonne IL — Ni-Al-Si alloys demonstrate the tendency to the formation of $L1_2$ ordered coherent precipitates. Diffuse X-ray scattering around both the fundamental and superstructure reflections is analyzed both theoretically and experimentally for Ni-Al-Si single crystal alloys with coherent ordered precipitates after stress annealing. The shape function of the coherent precipitates is discussed. Diffuse scattering reveals precipitation induced strong lattice distortions in the matrix. Distortions of the lattice together with the changes of the scattering factor in the volume occupied by the precipitate cause asymmetry of the diffuse scattering distribution. Oscillations of the diffuse scattering intensity are observed. The shape of the coherent precipitates is asymmetric with a 15% elongation along the stress annealing direction. Research at ORNL sponsored by the Division of Materials Sciences and Engineering, Office of Basic Energy Sciences U.S. Department of Energy, under Contract DE-AC05-00OR22725 with UT-Battelle and at APS under contract No. W-31-109-ENG-38.

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