

[o.m10.p1] Diffuse scattering in bulk solids and surface layers. R. Barabash., *National Technical University of Ukraine, ap.25, Proreznaya 4, Kiev, 252003, Ukraine*
 Keywords: diffuse scattering, solid solutions, surface.

Impurity atoms in solids create so-called Coulomb type displacement field. In low concentration limit the displacement field remains linear with the mean bond length. Real displacements of the matrix atoms can be found as a result of superposition of the partial displacements due to all defects in the crystal. They strongly depend on the symmetry of the force dipole tensor related to the point defects, on the matrix anisotropy, on the volume change in the matrix due to the impurity and on the concentration of defects. Point defects with cubic symmetry of the force dipole tensor in the cubic matrix result in the appearance of Huang scattering around all reciprocal lattice points. Both analytical approach and direct simulations over the lattice confirm that the distribution of diffuse scattering intensity around all reciprocal lattice points in that case corresponds to double-drop shape.

Near the surface of the crystal the conditions for scattering are changed. The boundary of the crystal allows the relaxation of the stress near the surface and distorts the static displacement field. In the direction perpendicular to the surface the displacements strongly depend on the distance to the surface. In the planes parallel to the surface the latter are retained periodic. The shape of an isodiffuse surface around reciprocal lattice point essentially differs for the in plane and out of plane reflections. The perpendicular to the surface component of the displacement field strongly influences the out of plane reflection. The character of intensity distribution is also different for the regions being located close or far from the reciprocal lattice points.

[o.m10.p2] Short-range order in quenched Al-Li alloys. I.S. Braude, T.V. Grigorova, L.G. Ivanchenko, *B.Verkin Inst. for Low Temp. Phys. & Engn. National Acad. of Sci. Ukraine., Ave. Lenin 47, 310164 Kharkov, Ukraine*

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The short-range atomic order in Al-Li quenched alloys (Li to 10.4at.%) has been studied by X-ray diffuse scattering technique. Analysis of the intensity distribution by well-known method [1] allowed to determine the short range order partial parameters (α_{eff} , α_{AlAl} , α_{LiLi}). The detailed analysis of rearrangement of atoms in twenty coordination spheres for investigated alloys is carried out. The so-called negative short-range order is received, that for the first coordination sphere $\alpha_{\text{eff}} > 0$. It means, that the nearest neighbors are the atoms of the same kind (Li) which with increase of concentration will form segregation. Already on the second coordination sphere the atoms Li are gathering in the ordered regions even in alloys Al-3.8at.%Li. In alloys Al- 10.4 at.% Li by the X-ray structural investigation the marking of the second phase are found out. As to atoms Al, in all alloys they are located chaotically. Correlation in atom arrangements in the regions of about 15 Å in diameter were found to be characteristic for the all alloys.

Obtained structural results allowed better an understanding of the regularities of plastic deformation in quenched Al-Li alloys at low temperature.

[1] V.I. Iveronova, A.A. Katsnelson: Short order in solid solutions, Moscow, p.246, 1977