Precipitation phenomena in ternary Al-Ag-Zn alloys have been recently studied by X-ray and electron microscope methods (Kähkönen, 1971; Popović & Passoja, 1971). These studies show that the precipitation sequence is GP zones → ε′ (h.c.p.) → ε (h.c.p.). The growth rate of the GP zones is increased with Zn content, and the next metastable state, ε′, forms more rapidly in Al-Ag-Zn alloys than in Al-Ag with equal Ag content. The misfit between GP zones and matrix also increases with Zn content. The decrease of this misfit with aging time at temperatures above 100 °C can be explained by the diffusion of Zn away from the zones (Popović & Passoja, 1971).

The present study deals with the formation and the growth of the GP zones in Al-Ag-Zn alloys quenched from the liquid state. Binary Al-Ag alloys have been recently studied by this method (Kähkönen, 1972). The ingots containing 90 at. % aluminum, 5 at. % silver and 5 at. % zinc were prepared from superpurity aluminum, silver and zinc. The alloys were studied by a fluorescence analysis method (Gould & Bates, 1972). The concentrations of zinc and silver were determined by the influence factor method. The isotope excitation was carried out, with 241Am source. The measurements were performed with a Si(Li) detector using a multichannel pulse-height analyser. The final specimens were prepared by the liquisol-quenching technique (Laine, Heikkila & Lähteenmäki, 1971). In quenching, the temperature of the substrate was about 20 °C. The thicknesses of the liquisol-quenched foils were about 80 μm. Small-angle X-ray measurements were made with a Kratky camera. A proportional counter in connexion with a single-channel pulse-height analyser was used in these measurements. A computer program was written in Fortran IV for the IBM 1130 for the calculation of the integrated intensities and the zone radii.

The first small-angle X-ray measurements were carried out immediately after the liquisol quenching at room temperature. No great changes were observed in small-angle X-ray scattering of a quenched specimen aged at room temperature. The quenched specimens always contained GP zones (Fig. 1). The mean value of the zone radius was about 8 Å (Fig. 2). The quenched specimens were then aged at temperatures of 140, 160 and 173 °C and the sizes of the zones (Fig. 2), and the integrated scattering intensities were measured as a function of aging time. The relative values of the integrated scattering intensities, \( Q(0)/Q(0)_{\text{quenched}} \), are shown in Fig. 3.

This study shows that the formation of the GP zones in ternary Al-Ag-Zn alloys cannot be suppressed by increasing the quenching rate. The mean size of the GP zones in a liquisol-quenched specimen is nearly equal to the growth rate of the GP zones in water-quenched sheet specimens (Kähkönen, 1971).

The decrease of the integrated scattering intensity with aging time (Fig. 3) shows that the formation of the next metastable state ε′ (h.c.p.) begins when the zone radius is smaller than 30 Å. Owing to the small size of GP zones the scattering intensities of the quenched specimens are relatively weak. Therefore the values of the integrated intensities cannot be determined very accurately in this case. In this study the values of the integrated scattering intensities of the quenched specimens were calculated in the same way.
for each specimen. These values of the integrated scattering intensities were taken as equal to one.

Wide-angle X-ray patterns taken after aging of 15 h clearly showed the existence of the metastable state ε'(h.c.p.). Wide-angle X-ray study of liquisol-quenched Al–Ag–Zn alloys is still in progress.

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References


X-ray diffraction from one-dimensional superlattices in GaAs$_{1-x}$P$_x$ crystals: erratum. By ARMIN SEGmüLLER and A. E. BLAKESLEE, IBM Thomas J. Watson Research Center, Yorktown Heights, New York 10598, U.S.A.

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The second harmonic strain amplitude $A_2$ in Tables 1 and 3(a) of Segmüller & Blakeslee [J. Appl. Cryst. (1973) 6, 19–25] should be doubled.

Owing to a program error the computed value of the second harmonic strain amplitude $A_2$, given in our paper (Segmüller & Blakeslee, 1973), is too small by a factor of 2. All values of $A_2$ in Tables 1 and 3(a) should be doubled. The symmetry ratio $q$ in Table 3(a) should read 2.7 and 1.4 rather than 2 and 1.2 for Crystals 1 and 2 respectively, resulting in a better agreement between the two models. In Table 4 the lattice spacings for the extreme composition $d_1$ and $d_2$ should read 5.62 and 5.55 for Crystal 1 rather than 5.61 and 5.54 respectively.

Reference


Crystal Data


Crystal data for thallium gallium diselenide, TlGaSe$_2$. By T. J. ISAACS, Westinghouse Research Laboratories, Pittsburgh, Pennsylvania 15235, U. S. A.

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Crystals of TlGaSe$_2$ were grown by solidification from melts. The space group $a=7.60$, $c=31.36$ Å, $\beta=90^\circ 20'$, is $P2_1/m$.

Origin of specimen

The compound TlGaSe$_2$ was made from high-purity elements (at least 99.999 %) obtained from American Smelting and Refining Company. These were weighted out in stoichiometric proportions, and were sealed in an evacuated silica-glass tube which was then heated slowly past the melting point of the compound. The melt was held at ap-