apparently depending upon the following factors: aluminum content, aging temperature and time, rate of deformation, and testing temperature. Aging at 550°C for about 48 hr appears to be optimum for inducing embrittlement. When given this treatment, the 6 pct Al alloy was completely ductile at room temperature in tensile testing but showed loss of ductility in impact testing. The 6 pct alloy had a transition in tensile ductility between 0° and 20°C. The 8 pct Al alloy was completely brittle at room temperature but had 15 pct reduction in area at 150°C. The 10 pct Al alloy was still completely brittle at 150°C but exhibited 10 pct reduction in area at 250°C. Embrittled specimens of the 8 pct Al alloy were restored to a ductile condition by annealing at 800°C. By cold working and annealing for 184 hr it was possible to produce two-phase microstructures at 800°C. X-ray data for the second phase are in agreement with the Ti₃Al phase reported by Ence and Margolin.

Acknowledgments

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Technical Note

Elastic Coefficients of Single Crystals of Alpha Brass

by W. R. Hibbard, Jr.

IN ref. 1, on the basis of tension and torsion experiments with single crystals of α brass, the values given in Table I were obtained for elastic coefficients. It was pointed out by Zener that the values for the 71.2 pct Cu were not satisfactory, since they resulted in a negative value for the bulk modulus, namely -4.17×10^{13} sq cm per dyne.

In reevaluating the data of this investigation, it was determined that the reason for this negative bulk modulus lay in the extrapolation of the reciprocal Young's modulus to the zero value of the orientation function shown in Fig. 5 of ref. 1. This extrapolation was reevaluated by the method of least squares (50 pct probability) and a new value of the coefficient S_{11} was determined as $18.92 \pm 0.42 \times 10^{13}$ sq cm per dyne in lieu of the value originally reported of 18.82×10^{13} sq cm per dyne. This new value of S_{11} leads to a new value of S_{12} of -9.43×10^{13} sq cm per dyne. The values of the other coefficients are unchanged.

Table I. Values for Elastic Coefficients

	10 ⁻¹³ Sq Cm per Dyne	
	71.2 Pct Cu	77.4 Pct Cu
S_{11}	18.82	17.10
S_{12}	-9.45	-8.23
S_{44}	15.55	14.90

On the basis of these new results a positive value of the bulk modulus of 5.55×10^{13} sq cm per dyne

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results. This value compares with the value of 12.3×10^{13} sq cm per dyne reported by Schmid and Boas.³ The new results are summarized in Table II.

Table II. New Results for Elastic Coefficients

	10 ⁻¹³ Sq Cm per Dyne	
	71.2 Pct Cu	77.4 Pct Cu
S_{11}	18.92 ± 0.42	17.11 ± 0.72
S_{12}	-9.43	-8.23
S_{44}	15.55	14.90
C_{11}	5.58	0.539
C_{12}	5.54	0.500
C_{44}	0.064	0.067
K	5.55	0.513

These results follow similar qualitative trends, previously published,³ relative to the effect of zinc content. However, the derived values of C_{11} , C_{12} , C_{44} , and K are so sensitive to the uncertainty in the first decimal place of the S_{11} values that they are probably not useful. This uncertainty must also apply to the previous results of Masima and Sachs,⁴ who obtained S_{11} values from a similar extrapolation drawn wholly above their data points.

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