to precipitation of the β' phase of the Cu-Be system and that the subsequent hardening is explained by slow precipitation of the ϵ phase of the Cu-Sn system.

In view of the high cost of beryllium, the fact that approximately the same properties can be obtained in a ternary alloy containing 0.75 pct Be as in a binary alloy containing 2.0 pct Be is noteworthy, and there seems no reason to believe that the cheaper alloy might not function satisfactorily in some of the applications where the binary alloy is now used.

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Technical Note

Lattice Parameter of InSb

by T. S. Liu and E. A. Peretti

A LITERATURE survey of the In-Sb system, which was made before a study of the binary diagram was undertaken, revealed that the intermediate phase InSb existed and that its crystal structure is face-centered cubic of the zinc blend type. In 1929 Goldschmidt[1] determined the lattice constant for InSb and obtained a value of 6.452Å. A more recent value, 6.461Å was reported by Iandelli[2] in 1941. The purity of the indium used was not very high, however. The indium used by Iandelli contained 2 pct Ge. In view of this fact it was decided to remeasure the lattice parameter using high-purity indium (99.97+ pct In) and spectrographically standardized antimony of the highest purity available (99.91 pct Sb).

Specimens corresponding to the InSb composition were made by carefully weighing the ingredients on an analytical balance and heating them in vacuo in a quartz tube at 700°C. As melting losses were negligible, the alloys were not analyzed chemically, but the intended analysis was taken as being accurate. Powder samples were prepared by either filing or crushing of the brittle alloy, followed by screening at 325 mesh. The powders were then annealed at 400°C in evacuated capsules for about an hour.

X-ray photograms were taken with a Debye and a back-reflection focusing camera, using characteristic cobalt K_α radiation. Lattice parameters were calculated by Cohen's[3] method. The results of a Debye pattern and of a back-reflection pattern at 25°C are given in Tables I and II.

The lattice parameter at 25°C is 6.4760Å.

Table I. Debye Pattern of InSb*

θ	Sin θ	d	Observed Intensity	hkl		λ
81.18	0.9881	0.9054	m	711 551	}	α_2
80.50	0.9863	0.9050	vs	711 551	}	α_1
73.55	0.9590	0.9328	w	444		α_2
73.23	0.9574	0.9324	w	444		α_1
69.43	0.9362	0.8638	w	642		β
65.33	0.9086	0.9846	vw	533		α_2
65.10	0.9070	0.9842	m	533		α_1
61.23	0.8765	1.021	vw	620		α_2
61.05	0.8750	1.020	m	620		α_1
55.08	0.8200	1.089	s	531		α
51.68	0.7846	1.138	vw	440		α
48.13	0.7446	1.086	w	531		β
46.23	0.7221	1.236	m	333 511	}	α
42.90	0.6807	1.311	s	422		α
37.38	0.6070	1.471	m	331		α
33.93	0.5581	1.599	w	400		α
27.63	0.4637	1.925	s	311		α
25.08	0.4238	1.918	vw	311		β
23.40	0.3971	2.248	vs	220		α
21.18	0.3612	2.239	vw	220		β
14.28	0.2464	3.623	vw	111		α

* Cobalt radiation with iron filter.
s, strong; m, medium; w, weak; vw, very weak.

Table II. Lattice Constant Calculation for Focusing Back-Reflection Pattern Taken at 25°C

Plane		$\text{Sin}^2\theta$	$h^2+k^2+l^2$	δ*
711 551	α_2	0.976348	51	5.3
711 551	α_1	0.972111	51	6.4
444	α_2	0.922410	48	17.4
444	α_1	0.917841	48	18.4
731 553	β	0.913711	59	19.2
642	β	0.874521	56	27.5
533	α_2	0.820171	43	38.6
533	α_1	0.816538	43	39.3

Normal Equations

$184596K$† $+ 2571.3D = 1097.96^1$

$25171.3K + 4868.44D = 149.578^2$

$K = 0.00596105$ $\quad D = -0.00009037$ $\quad a_o = 6.4760$

* $\delta = 2\phi\ \text{Sin}^2\phi$, where $\phi = 90° - \theta$.

† $K = \frac{1}{4}a^2{}_o$, λ is incorporated into the equations.

Values of λ are based on those adopted at the conference of the X-ray Analysis Group of the Institute of Physics, London (1946).[4]

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T. S. LIU, Student Associate AIME, is Teaching Fellow and E. A. PERETTI, Member AIME, is Professor of Metallurgy, University of Notre Dame, Notre Dame, Ind.

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