The Ce-Nd (Cerium-Neodymium) System

140.12 144.24

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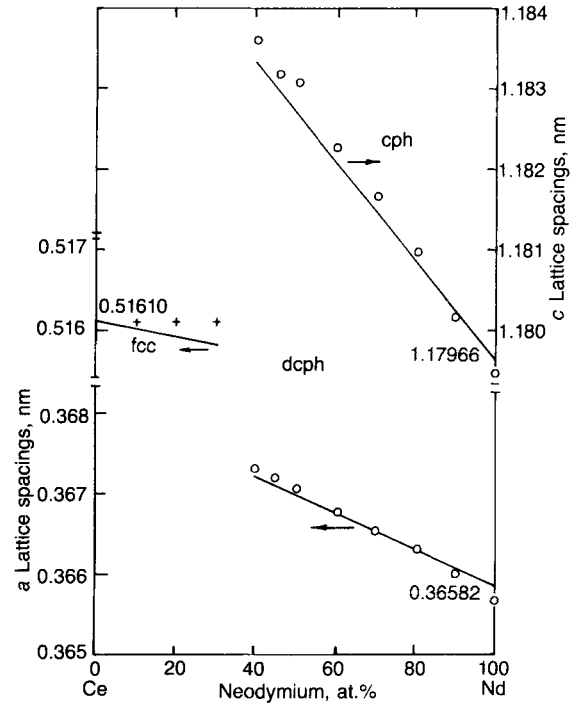
Lattice Spacings

No phase diagram for the Ce-Nd system was found in the literature, but Speight *et al.* [68Spe] measured the room temperature lattice spacings for this alloy system. Their alloy specimens were made from Ce metal, which contained no more than 100 ppm other rare-earth metals, and from neodymium metal, which contained approximately 200 ppm of base metals and <1000 ppm other rare-earth metals. Lattice spacings were determined by X-ray diffraction, and a Nelson-Riley extrapolation was used to eliminate systematic errors. Their data for the Ce-Nd system, reported in kX units, have been converted to nanometers (nm) and are plotted in Fig. 1. In the Ce-rich fcc region, the lattice spacings appear to be independent of composition. A small deviation from ideality exists for both the *a* and the *c* lattice spacings in the dcph region except at Nd-contents greater than 90 at.%, where a small negative deviation from ideality exists.

Fig. 1 Lattice Spacings in the Ce-Nd System



The straight lines show the Vegard's law relationships based on data from [78Bea, 78Kos].

Cited References

68Spe: Speight, J.D., Harris, I.R., and Raynor, G.V., *J. Less-Common Met., 15,* 317 (1968).

78Bea: Beaudry, B.J. and Gschneidner, K.A., Jr., in *Handbook on the Physics and Chemistry of Rare Earths,* Vol. 1–*Metals,* Gschneidner, K.A., Jr. and Eyring, L., Ed., North-Holland Publishing Co., Amsterdam, 215 (1978).

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The Ce-Tb (Cerium-Terbium) System

140.12 158.9254

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Lattice Spacings

Lattice spacings for alloys in the Ce-Tb system were reported by Speight *et al.* [68Spe]. Gschneidner *et al.* [62Gsc] measured lattice spacings of several Ce-rich binary alloys with the other rare-earth metals and reported the *a* spacing for the Ce–2 at.% Tb alloy. There is no report on the purity of the metals used in the latter research. Speight *et al.* used Tb containing about 200 ppm base metals and less than 1000 ppm other rare-earth metals. Their Ce metal had no more than 100 ppm other rare-earth metals. Lattice spacings were determined by X-ray diffraction techniques, and a Nelson-Riley extrapolation was used to eliminate systematic errors. The lattice spacing data reported by Speight *et al.* and by Gschneidner *et al.* are presented in Fig. 1 and 2 for the *a* and *c* spacings, respectively.

In the Ce-rich fcc region, all data points show a positive deviation from the Vegard's law line. At somewhat higher