

THERMAL EXPANSION AND MAGNETOSTRICTION OF Be_6Cu

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Introduction, Results, and Discussion

As part of target fabrication activities for the National Ignition Facility, we have made preliminary measurements of the thermal expansion and magnetostriction of polycrystalline Be_6Cu (Be alloyed with 6% Cu by weight). The magnetostriction at low temperatures is small and positive consistent with simple paramagnetic behavior. The thermal expansion from 2 to 20 K is negative and shows a pronounced feature at 5 K. Subsequent measurements confirm the negative thermal expansion up to about 100 K with no sign of a low temperature feature. Since the thermal expansion of pure Be is positive and increases monotonically with increasing temperature, our results suggest that both the sign and the magnitude of the low temperature thermal expansion of these BeCu alloys can be engineered to suit a particular application. The origin of the negative thermal expansion is presently unknown but will be the focus of further studies of this technologically useful material.

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