Magnetostrictive Behavior of Antiferromagnetic CoO Single Crystal in Magnetic Field

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Abstract

The magnetostriction of CoO single crystals were measured along three principal crystallographic directions in fields up to 11 KOe. The magnetostriction appears from ten degrees below the Néel temperature. The magnetostriction observed at liquid air temperature is strongly dependent on an applied field and can be described in the form of $\lambda=[a+b\cos 2(\phi-\phi_0)]H^2$, where H and ϕ are the intensity and direction of the field, respectively, and a, b, and ϕ_0 are constants independent of the field. The result is briefly discussed in connection with the magnetization process occurring in antiferromagnetic CoO single crystal and it is suggested that the displacement of antiferromagnetic domain walls plays the most important role in the magnetostriction induced by an applied field.

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