that the narrow lines in Shpol'skiĭ spectra have all the basic attributes of optical NPL. Investigation of the basic parameters of the NPL and PW in these spectra enables us to extract information on the phonon spectrum of the matrix crystal and the electron-phonon interaction constants in the systems concerned. However, a number of structural features of the spectra and, in particular, the problem of the origin of the "multiplets" characteristic for these spectra still await their resolution.

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E. I. Kondorskiĭ, T. I. Kostina, and L. N. Ékonomova. Investigation of the Electrical and Magnetic Properties of Chromium Single Crystals

Resistivity was investigated on $4 \times 1.5 \times 1$ mm single-crystal samples with a ratio $R_{293°K}/R_{4.2°K} = 500$ cut from the same crystal by the electric spark method in such a way that the longitudinal axis of the sample was parallel either to the [100] or the [110] axis. The magnetic measurements were made on single-crystal samples of iodide chromium with resistivity ratios $R_{293°K}/R_{4.2°K} = 130$ and $R_{293°K}/R_{4.2°K} = 6.4$. Both of these groups of samples contained the same amount of metallic impurities (within the limits of accuracy of the spectral method), but those with $R_{293°K}/R_{4.2°K} = 6.4$ contained a larger amount of dissolved gases.

Figure 1 presents plots of the temperature $R = f(T)$ in the phase-transformation regions (the anomaly at $T_{S\text{-}f}$ for sample Nos. 2–4 (current I ∥ [011], I ∥ [001] and I ∥ [001]); curves 1–3—before thermomagnetic treatment, 4, 5—after treatment in a field H_c ∥ [110], 6, 7—in a field H_c ∥ [100]; 1′–3′—the anomaly at the Neel point T_N before thermomagnetic treatment, 4′, 5′—after treatment in a field H_c ∥ [110]). For samples with their longitudinal axes parallel to the [110] axis and the current I ∥ [110], $T_{S\text{-}f} = 115 \pm 2°K$, while for specimens whose longitudinal axes were parallel to [100] with the current I ∥ [100], $T_{S\text{-}f} = 134 \pm 2°K$. After cooling from 360°K in a transverse magnetic field $H_c = 34$ kOe parallel to the [001] axis, the anomaly at $T_{S\text{-}f}$ becomes the same for all samples, occurring at $T_{S\text{-}f} - 120 \pm 2°K$. Heating of the sample above the Neel point fully restores the original character of the $R = f(T)$ dependence and the original value

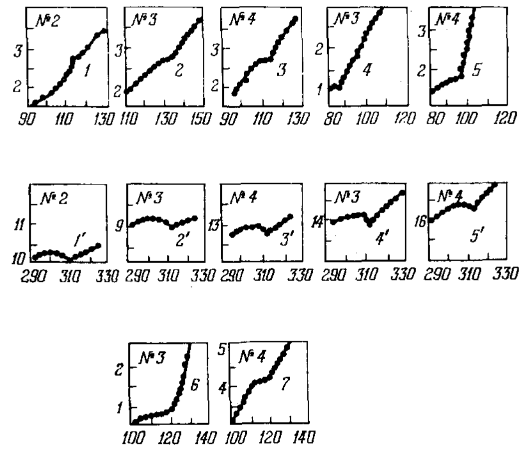
FIG. 1

of $T_{S\text{-}f}$ (the abscissa is T in °K and the ordinate $R_T/R_{77°K}$).

Measurements of the magnetostriction λ of chromium by the wire-strain-gauge method showed that in fields of 10 kOe it approaches that of iron in order of magnitude, although the magnetization of chromium in these fields amounted to only hundredths of a gauss. The large value of λ in chromium can be explained by displacement of domain walls during magnetization. The existence of domains was recently proven by neutron-diffraction studies. It would be reasonable to assume that because of the strong magnetostriction in chromium samples with inhomogeneous internal stresses, the displacements of the domain walls will be irreversible and that magnetic hysteresis may exist in sufficiently strong fields.

Figure 2 shows the magnetization curve obtained for a sample taken from a chromium single crystal with resistivity ratio $R_{293°K}/R_{4.2°K} = 6.4$. The magnetization is found to be a nonlinear function of the field at $H > 12$ kOe, and a distinct magnetic hysteresis is observed, both at $T = 77°K < T_{S\text{-}f}$ (phase AF_2) and at $T = 293°K > T_{S\text{-}f}$ (phase AF_1). The residual magnetization was zero throughout the temperature range studied. Consequently, magnetic hysteresis is a property of chromium crystals and cannot be attributed to ferromagnetic impurities.

Neutron-diffraction investigations of chromium lead to the conclusion that after thermomagnetic treatment, the AF_2 phase is a single domain with a unique direction of the wave vector **Q** and the spin vector **η**.

Our investigations showed that the magnetic hysteresis vanishes after thermomagnetic treatment of chromium single crystals in a field $H = 19$ kOe. Thus, the hysteresis exists only in specimens containing a sufficient number of domains with different directions of **Q** and η.

R. F. Arutyunyan and M. L. Ter-Mikaelyan. The Radiation of Charged Particles in Inhomogeneous Media and its Applications

The paper summarizes data from experimental investigation of the radiation that appears when a charged particle passes through various inhomogeneous media.