where $D=[x(x+y)T^2+1-F^2]^2+y^2T^2+4F^2$; $x=\omega_d-\omega_{ab}(H_0)$; $y=\omega_s-\omega_{bc}(H_0)$; $R=\omega_{bc}(H_0)/\omega_{ab}(H_0)$; $k=-|M_{xab}(H_0)|^2(\rho_a^0-\rho_b^0)$; $F=(TH_2/2\hbar)|M_{ybc}(H_0)|$; ρ^0 is the normalized Boltzmann factor appropriate to the time-independent energy of the system, and M is the magnetic moment operator. Equation (1) predicts the observed results closely if allowance is made for reasonable error in the measurement of H_s (see Fig. 2).

Although the use of ρ_{inst} is not essential to the explanation of the effects described here, its use does contribute an additional asymmetry to the line shape which should be detectable in a carefully performed experiment. A more complete description of the present work is in preparation.

* Supported in part by the Office of Naval Research and the U. S. Air Force.

[1] J. H. Burgess, Phys. Rev. **95**, 608 (1954).

Dichroism of the *F* and *M* Absorption Bands in KCl

C. Z. van Doorn and Y. Haven
Philips Research Laboratories, N. V. Philips' Gloeilampenfabrieken, Eindhoven, Netherlands
(Received August 3, 1955)

An additively colored KCl crystal, which has been quenched from high temperature and kept for some time at room temperature, shows the M absorption band ($\lambda=8100$ A at 77°K) in addition to the F band. Dichroism in the F and M bands is observed under the following conditions[1]:

The crystal (at 77°K) is strongly irradiated (beam in [100] direction) with light ($\lambda=5461$ A) polarized in the [011] direction. After a couple of minutes the M absorption for light polarized in the [011] direction appears to have been increased, while it has decreased in the [0$\bar{1}$1] direction of polarization. The F band shows just the opposite behavior (Fig. 1). After the irradiation has been cut off, the dichroism persists for at least several hours at 77°K but is destroyed after warming the crystal to about 200°K. Irradiation with light polarized in the [001] direction similarly induces a dichroism along this direction, though weaker than in the former case. Irradiation in the M band does not show any of these effects. The F band in freshly quenched crystals (no visible M band) does not show any dichroism.

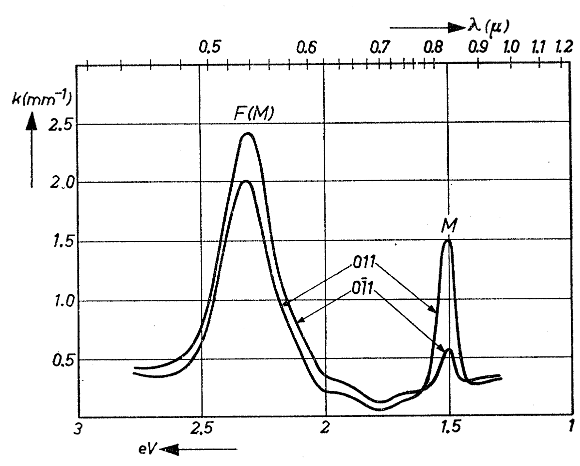

Fig. 1. Absorption of a colored KCl crystal in the [100] direction, measured with light polarized in the [011] and [0$\bar{1}$1] directions. The crystal is irradiated beforehand with light ($\lambda=5461$ A) polarized in the [011] direction. The absorption curve before irradiation is intermediate between the two shown.

From these experiments the following conclusions can be drawn:

(1) The centers responsible for the M absorption (M centers) are anisotropic; dichroism is due to nonisotropic distribution of their axes of anisotropy.

(2) The direction of these axes is along the twofold symmetry axes. (The threefold and fourfold symmetry axes can be excluded because these orientations cannot show dichroism along the [001] and [011] directions respectively.)

(3) The same conclusions as (1) and (2) hold for the centers responsible for the dichroism of the F absorption, and therefore these centers cannot be the F centers causing F absorption in freshly quenched crystals.

(4) Since irradiation in the F band causes nonisotropic distribution of the axes of anisotropy of both types of centers, there is strong evidence that these centers are identical. If that is so, irradiation in the F band apparently causes reorientation of the axes by ionic movement and the effect is therefore quite distinct from the dichroism found by Ueta[1] in KCl after selective bleaching of the M band by irradiation with polarized light in this band at room temperature.

(5) The opposite behavior of dichroism in the F and M bands shows that for one direction of orientation ([011] or [0$\bar{1}$1]) the F absorption is stronger and the M absorption weaker than for the other direction of orientation ([0$\bar{1}$1] or [011]).

[1] Weak dichroism in the F band was found by S. Nikitine, Compt. rend. **213**, 32 (1941); **216**, 730, 758 (1943); J. phys. radium **3**, 203 (1942). Dichroism in the M band was observed by M. Ueta, J. Phys. Soc. Japan **7**, 107 (1952).

Reflectivity of Several Crystals in the Far Infrared Region between 20 and 200 Microns*

Hiroshi Yoshinaga
Department of Physics, The Ohio State University, Columbus, Ohio
(Received September 2, 1955)

The reflectivities of Ge, Si, InSb, PbS, PbSe, and TlCl in the region between 20 and 200 microns were measured with the far infrared spectrograph in this laboratory.[1] Figure 1 shows the results of the measurements.