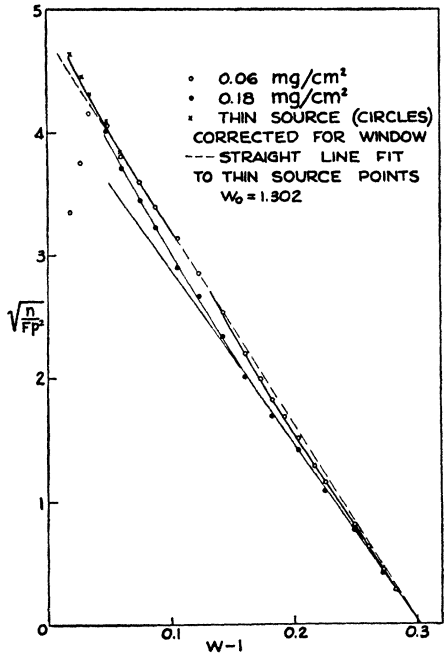

FIG. 2. Fermi plot for C^{14}.

shape may appear to be nearly allowed while the classification is still forbidden. However, Gerjuoy[7] has argued that this explanation is implausible. If the transition is really first-forbidden (unfavored) with a parity change,[7] a much wider latitude in fitting the theory to the observed spectrum shape would be permitted. This would require a modification of the shell model prediction.

I would like to thank Mr. P. S. Magee for performing the chemical conversion.

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† This work was assisted by the joint program of the ONR and AEC.
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A Thermal Mechanism for Residual Latent Image Fading in Nuclear Emulsions

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August 4, 1950

EXPERIMENTS by Mather[1] on fading rates in nuclear emulsions indicate a reduction of approximately 90 percent in the fading of proton tracks when stored prior to development in a vacuum, indicating that at least that proportion of the fading phenomena is chemical in nature, with some constituent of the atmosphere the agent involved. However, it is proposed that some or all of the residual 10 percent of the fading can be explained on the basis of the thermal ejection of electrons from the silver specks of the latent image.

This mechanism would consist in the acquisition by these electrons of sufficient energy to re-enter the conductance band of the crystal, causing an electrolytic current of silver ions to flow from the latent image into the grain. The electrons will recombine with the ions in the interior of the grain where the resulting Ag atoms cannot function as nuclei for development, a redistribution of the latent image similar to that occurring in the Herschel effect. The dissociation energy required to remove an electron from the silver specks comprising the latent image will equal the difference between the work function ϕ of the specks and the energy of the lowest state of the conductance band. The most recent value for this energy has been given[2] as 0.77 ev, and is great enought to assure the comparative stability of such images with respect to thermal decomposition at ordinary room temperatures, corresponding to an energy of approximately 0.7 ev. However, a relatively slight change in one of the factors governing the magnitude of the dissociation energy would be sufficient to alter the rate of thermal regression of a latent image at room temperature. This latter condition is fulfilled in nuclear emulsions to a certain degree, since the size of the silver specks after particle irradiation is much smaller than of those in optical emulsions, leading to a lower value for ϕ and hence to a lower value for the energy needed to release a trapped electron. The smaller size will be due to the rapidity with which a radiation particle traverses the halide grains (about $2\cdot10^{-14}$ sec. for 5 Mev alpha-particles). Since the migration of the silver ions through the crystal is considerably slower than that of the electrons, the sensitivity specks will acquire negative charges faster than they can be neutralized and further electrons will be repelled until sufficient silver ions have reached the specks. By that time, however, no further electrons will be available and the repelled electrons will have combined with silver ions in the interior of the crystal. Thus, in a very rapid transfer of energy to the emulsion, the latent image will tend to contain unusually small silver specks, which is generally the case. The small size also may be expected to contribute to the atmospheric instability of the latent image.

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Mechanism of Magnetization in Alnico V

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July 21, 1950

USING magnetic powder pattern technique,[1] new information has been obtained on the mechanism of magnetization in the alloy containing 14 percent Ni, 8 percent Al, 24 percent Co, 51 percent Fe, and 3 percent Cu (Alnico V). This permanent magnet alloy is unique in that it responds to heat treatment in a magnetic field, and the work here reported has been done to try to explain this action.

Figure 1 shows photographs of magnetic powder patterns of polycrystalline Alnico V cooled from 1300°C at 2° to 5°C per second to 810°C and then oil-quenched, a field being present from 900°C to room temperature. Figures 1(a–c) show photographs in which the specimen was magnetized vertically during heat treatment and horizontally during observation. In (a), domains are seen to lie in a vertical direction and as the field is increased from zero to successively higher values (b, c) the domain boundaries either disappear or the domains contract in width and the horizontal lines (splotches), which indicate the direction of magnetization,[1] gradually rotate toward a vertical position. When the specimen is near saturation, the boundaries of the domains disappear and the originally horizontal lines have become vertical. It is evident, therefore, that in this case the mechanism of magnetization is mainly one of rotation and not of boundary displacement.

Figure 2 shows the magnetization curve for the specimen shown in Figs. 1(a–c). The coercive force of this specimen was only 17 oersteds and yet the knee of the magnetization curve occurs in the neighborhood of 450 oersteds. This indicates that the material has a high anisotropy caused by heat treatment in a field. If this material could be divided into fine particles[2] (e.g., by precipitation