Influence of Intercrystalline Forces on β-Ray Absorption

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MY attention has been called to a letter in *The Physical Review** under the above title. I agree with the statement that there is no difference in the absorption of beta-rays in hard-rolled aluminum and in aluminum annealed at 350°C. Two experiments were run at that temperature and both experiments showed no difference.

However the difference is quite evident if the annealing is carried out at a temperature between 450°C and 500°C. This experiment has been performed many times and a difference in absorption was always found.

One should use the same sheet of aluminum in its two different states—hard-rolled and annealed—instead of using two different sheets.

In checking for this change in absorption it seems better to use a Curie electroscope than a Geiger counter because of the greater stability of the former.

* Henri D. Rathgeber, Phys. Rev. **69**, 239 (1946).

Possible Results of a New Reaction

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WE would like to point out some interesting possibilities in a new reaction. With the availability of tritium in fairly large quantities, the reaction of deuterium on tritium should be possible. There are several possible ways for the reaction to go. If the following occurs:

$$_1H^3+{}_1H^2\rightarrow{}_2He^4+{}_0n^1,$$

the reaction may be a source of high energy neutrons all of the same energy. From rough mass difference values the expected Q value would be about 17.6 Mev.

A second possible reaction is

$$_1H^3+{}_1H^2\rightarrow{}_2He^3+2{}_0n^1,$$

with either the creation of three particles with a continuous neutron energy range up to a maximum or the possible emission of a "di-neutron," ${}_0n^2$. The existence of the di-neutron has been discussed but no evidence for their existence has been found. If they do exist, then important knowledge concerning the binding energies can be obtained from this reaction.

Solarization of Manganese-Bearing Glass at Higher Temperatures

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THE purple color which is formed in colorless glasses containing manganese after exposure to sunlight or ultraviolet light was noted many years ago. This discoloration may be removed readily by heating the glass near its annealing range, whereby the original colorless state of the glass is regenerated. The coloration is explained by a reversible reaction between colorless divalent manganese and the pentavalent arsenic usually present in the glass, in which light causes an oxidation of manganese to the purple trivalent form and an accompanying reduction to trivalent arsenic. Heating near the annealing range causes a reversal of the reaction.

A preliminary investigation has been made of the color changes produced by irradiation of glass at temperatures extending to the annealing range of the glass. The glass composition was a commercial soda-lime-silica type containing small amounts of manganese and arsenic. Various small polished specimens (about 3 mm thick) were heated in an open electric furnace and exposed to ultraviolet radiation from a quartz-mercury arc lamp for a period of about 24 hours. Spectral transmission curves of the colored glass were obtained by use of a G.E. recording photoelectric spectrophotometer through the courtesy of Professor J. O. Kraehenbuehl.

The spectral transmission curves were used to determine the wave-lengths of maximum absorption of glasses irradiated at various temperatures, as shown by the open circles in Fig. 1a. The wave-length of maximum absorption shifts toward shorter wave-lengths as the temperature of the glass is increased, the glasses becoming reddish-purple.

Figure 1b shows the percentage transmittance of these glasses at the wave-length of maximum absorption. Only a small variation is noted up to about 450°C, which is the lower annealing limit of the glass. At higher temperatures the transmittance increases and only faint colors are produced. The variation in color produced by irradiation of glass at different temperatures is associated with the ionic

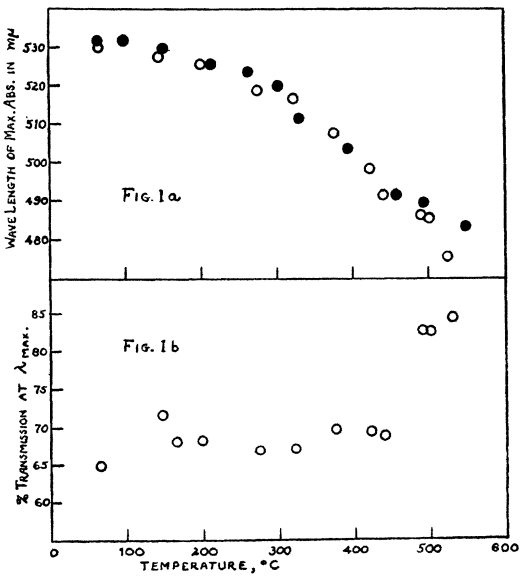

FIG. 1. a. Open circles, wave-lengths of maximum absorption for glass irradiated at various temperatures. Solid circles, wave-length of maximum absorption for glass irradiated at room temperature and then heated to the temperature indicated. b. Percentage transmission of glasses at the wave-length of maximum absorption.