selenium surfaces should be treated with thallium or lead in order to obtain transitions between the thallium-selenides or lead-selenides, respectively, and the selenium for producing infrared maxima, also in barrier-layer cells. We actually succeeded in creating maxima[14] in the region of 800 mμ and, by treatment with lead, to shift the longwave limit far beyond 1 μ. By cooling down the lead-treated cells to a temperature of carbon-dioxide snow, we detected symptoms of infra-red excitation of the sensitivity and a diminution in the inertia-phenomena and in the dependence on frequency. Experiments with In-Se-intermediate layers, not published so far, show a very distinct maximum near 780 mμ (see Fig. 1). The effects of the above-mentioned modes of treatment on the spectral distribution in the near and far ultra-violet have not yet been fully analysed. Rough investigations, during which the Cd-treatment was effected by means of an electrolytic method, show that such influences must be strong. A distinct new maximum near ~ 380 mμ was thereby produced.[14]

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NEW TYPE NUCLEAR REACTION

THE observation of a new kind of nuclear reaction that yields energy and is akin to thermonuclear reactions was reported recently to the American Physical Society by scientists in the University of California Radiation Laboratory. The new phenomenon is described as a "catalyzed nuclear reaction". This adds to those reactions already known to science a new and third way of making a nuclear reaction take place. The older ways are either to induce thermonuclear reactions, in which two light nuclei fuse into a heavier one when the temperature is raised to roughly one million degrees, or else to bombard nuclei with other nuclear particles from accelerators like cyclotrons or nuclear reactors.

In order to make a nuclear reaction take place, two nuclei must touch. The new discovery is a way of pulling two nuclei together so that a proton and a nucleus of heavy hydrogen (a deuteron) can combine to form helium-3 with the release of 5·4 million volts of energy. This pulling together takes place in a mesic molecule.

In a normal molecule the nuclei of the component atoms are pulled together weakly by electrons. But the electron can be replaced by a much heavier particle, the negative mu meson. Because the mu is 210 times heavier than an electron, it circles the nucleus at only 1/210 of the distance of an electron, and thus binds the two nuclei correspondingly closer. The nuclei then have a good chance of touching, and the nuclear reaction can take place.

The reaction is termed a catalyzed reaction because the mu meson is not consumed by the reaction but may be ejected from the molecule by the energy released. The mu is then free to catalyze more reactions, in chain fashion.

It is however emphasized that at the present time the energy producing chain of catalyzed reactions cannot continue long enough to generate commercially useful amounts of power, because mu mesons decay into other particles after two-millionths of a second. Unfortunately, from the point of view of thermonuclear power mu mesons can be made only in high-energy nuclear collisions of particles accelerated by cyclotrons and other expensive machines. But the possibilities will be greater if a much longer lived particle, with properties similar to that of the mu meson, can be found.