I wish to thank Prof. A. A. Vlasov sincerely for his interest in the accomplishment of this work.

Translated by D. C. West
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LIBERATION OF GAS UPON CLEAVAGE OF CRYSTALLINE QUARTZ

V. V. KARASEV

Institute of Physical Chemistry, Academy of Sciences, U.S.S.R.

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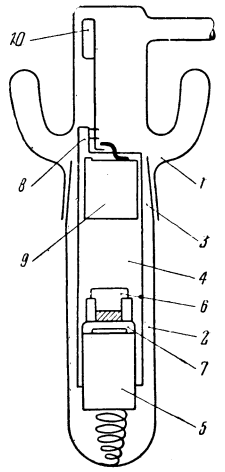
PREVIOUSLY reported experiments[1] disclosed electron emission upon cleavage of certain crystals in a vacuum of 10^{-4} to 10^{5} mm Hg.

To study and to explain further the nature of the emission, it was necessary to use higher vacuum, which in turn called for development of a new procedure. To attain high vacuum in the simplest possible manner, it was decided to make the equipment completely of glass, like the instruments used for the study of the kinetics of chemical reactions



(see diagram). The upper portion of the instrument consisted of a trap 1 for the lubricant vapor with a ground neck. The lower portion of the instrument consists of a sealed tube 2 which was inserted into ground section 3. Placed inside the instrument was a setup for cleaving solid specimens to incandescence, consisting of stainless steel tube 4 with windows, and of a brass cylinder with spring 5. Attached to this cylinder were guides for a knife 6 and a holder for x-ray film 7. Located in the upper portion of the tube was a trigger 8 for falling weight 9.

The instrument was sealed to a vacuum mercury pump and evacuated to a pressure of approximately 10^{-7} mm Hg (the vacuum was measured with an ionization manometer). After evacuating the instrument, lever 10 of the trigger was rotated with an electromagnet, and the weight fell and fractured a plate approximately 4 mm. The photographic film was exposed to the electrons emitted from the gap formed upon cleavage of the plate.

It was observed in the preliminary experiments that upon cleavage of glass and diffused quartz there is no noticeable change in the vacuum, and no electron emission was observed (like in the previous experiments).

Cleavage of crystalline quartz (like in the previous experiments) caused electron emission, and the pressure rose to 10^{-4} to 10^{-5} mm Hg (measured with an ionization manometer). The area of the fresh surface obtained upon cleavage of crystalline quartz was approximately 1 cm^2. The capacity of the vacuum system was about 1300 cubic cm. Liberation of gas was observed also upon splitting of mica and stripping of high-polymer films from glass.

The author is grateful to Professor B. V. Deriagin for valuable advice.

[1] N. A. Krotova and V. V. Karasev, Dokl. Akad. Nauk SSSR **92**, 607 (1953).

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ON ELECTRON CAPTURE IN BETATRONS

A. N. MATVEEV

Moscow State University

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LOGUNOV and Semenov[1] have pointed out the existence of statistical capture of electrons into betatron orbits and have estimated the efficiency of this mechanism. This calls for the following two essential remarks.

1. This mechanism can work only at not too large densities of the injected electrons. In par-