43. Operation of an Electron-multiplier.

Sakae Simizu, Hidekuni Takegoshi, Eiko Nishimura and *Nariyoshi Ogura.*

(K. Kimura Laboratory)

An electron-multiplier which contained thirteen electrodes was constructed by us. One or more electrons emerging from the first electrode under the action of radioactive rays or other ionizing particles are amplified to a measurable number by the ejection of secondary electrons at the successive electrode surfaces.

In order to use this multiplier as a counting apparatus for individual particles, the thermionic emission at the first electrode being necessary to be avoided as possible, the electrodes need to be made of the metal with a high work function. For this reason we adopted beryllium-copper alloy (Be 2 % +Cu 98 %), which has a work function of 4 eV and the thermionic emission at the room temperature is negligible. The secondary emission ratio of this alloy was about 2, but this value could be raised to 3~5 by the heat treatment at 500°~700° for about 30 minutes in good vacuum (10^{-3}~10^{-4} mm Hg). After this procedure we could expose the surface of the alloy without any serious deterioration. Each electrode, made of the alloy sheet (0.2 mm thick), was mounted between two mica sheets in proper geometry, which is very suitable for focusing the ejected secondary electrons on the next electrode successfully.

After a whole apparatus was evacuated up to 1×10^{-5} mm Hg by the use of two diffusion pumps with a liquid air trap, negative high voltage of 2000~5000 V (i. e. 200~500 V per stage) was applied. The electrons multiplied 10^4~10^5 times were caught at the collector, which was a nickel wire 0.5 mm in diameter, and caused the potential drop at the top grid of the linear amplifier.

The counting rate for a given particle increased as the voltage per stage was raised up to 500 V, but when the voltage was increased beyond 350 V, the background noise increased very rapidly. The counting efficiency of this multiplier for γ-rays was about 10 % of Geiger-müller counter's; while for α-particles the efficiency seemed to be 100 %. Determination of efficiencies for β-particles or other ionizing particles is now in progress.

---

44. Electron Bombardment Conductivity of (BaSr) O. (II)

Kiichi Kimura and *Kyozo Ohira.*

(K Kimura Laboratory)

In the previous report we found that, when (BaSr) O was bombarded by electrons from ThW emitter, the resistance v. s. applied accelerating voltage curve shows the