according to our other experiments, the efficiency of the guard counters for cosmic rays was nearly 100 %, the anticoincidence circuits being, on the other hand, supposed to be in perfect operation, and the resolving time of our circuits was so small (1.93×10^{-5} sec) that we needed no particular consideration on the accidental coincidences. This means {the 10.6/min. of the remained counts} are too much to be explained.

We then separated the coincidence counters into two parts and measured the natural counts, inserting an absorber (Pb plate of 1.02 g/im^2 in thickness) between the two, when the remained counts were found to be 3.5/hour. Using an absorber of various kinds in place of the Pb plate, we got an absorption curve very similar to β rays. So it might be reasonable to conclude that the counters have activities by themselves on account of contamination.

1) "An attempt t) extinguish the natural counts of G-M counters (I)" Rep. -f Inst, for Chem. Res. Kyoto Univ,, Vol. 18, P. 86. (1949).

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40. On the γ Rays of K^{40}.

Kiichi Kimura, Takeo Hayashi, Yoshihide Ishizaki
and *Kiyoshi Nishikawa.*

In studying the disintegration schema of K^{40}, it is important that we should make clear the relation between its β-rays and γ-rays. We could measure this relation with conincidence counters which were specially devised to eliminate the natural background as less as possible (The details of this counter will be described in this reports under the title of " an attempt to eliminate the natural counts of the G-M counter (II)"). The size of the sample (pure KCl) was 5 mm thick, 50 mm long and 20 mm wide, weighing 7 g, which was inserted between two Geiger counters of rectangular section. In addition to this, a lead plate of 1.05 g/cm^2 thick was interposed between the one counter and the sample to absorb β-rays. The window of the other counter (β counter) was of Al-foil (5 mg/cm^2 in thickness). These two coincidence counters were so arranged as to be surrounded by the guard counters which were connected with the anti-coincidence circuits to eliminate the natural counts.

According to our measurement, the mean counts of the β rays from the sample were 145/min and the γ counts 0.60/min. Using these values and the number of the β decay-26.8±1.2 per second per gram of potassium (T. Graf, phys, Rev, 74, 831 (1948)), we came to calculate the estimated value of β-γ coincidence, which was found to be 0.98 per hour.

The actual counts of coincidence in our experiments are as follows:

natural counts 35/10 h.

Sample + natural 31/10 h.

Based upon these results, we can conclude, taking the above mentioned estimation into consideration, that the β-γ coincidence does not exist.

Our result of measurement will be favourable, though indirectly, to the defence of the existence of K-capture which should be accompanied by γ-radiation. The more direct measurement of the correlation of K-capture and γ-rays remains yet unattempted. Its achievement is expected in near future.

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41. On the Properties of 2π-type β-Ray G-M Counter.

Yoshiaki Uemura, Sakae Shimizu and *Yoshio Saji.*

In order to count effectively weak β-rays, we constructed 2π-type β-ray counter with a thin mica window. The diameter and length of the cathode of this counter are 25 mm and 30 mm respectively and its central wire of 0.2 mm diameter has a small glass ball of 1 mm diameter at the top. The filling gas used is alcohol-argon mixture. By means of this counter, we investigated to obtain an absolute number of β-particles of the sample.

By changing the distance between the window and a silver disc activated by slow neutrons, used as β-ray source, we ascertained that the number of counts varies as such

$$I = I_0 e^{-kx},$$

where I is the counts when the sample is placed at x mm apart from the window and I_0 is that at 1 mm. k is a constant concerning the dimension of counter. Disc sources of 22.6, 15.9 and 11.1 mm in diameter were used. Difference of counts due to these sources is considered as the counts due to ring zones. The above relation was also easily verified for each zone. Then each count was extrapolated to 2π-plane of the counter according to the relation, when the counts per unit area in each zone were found to be different. It is considered to be due to the difference of sensibility.

The correction for sensibility is calculated, by assuming the sensibility for the middle zone to be 100 % and by taking the absorption of the mica window into account. By these procedures, using 2π-type counters of different size, we obtained for the same sample the very agreeable value as the number of β-particles.