Abstracts of Papers

The following 32 papers are the second part out of 89 papers, read before the semi-annual meeting of the Institute on June 2 and 3, 1951.

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1. The Nuclear Reaction of N^{14} with Low Energy Neutrons. (II)

Kiichi Kimura, Ryutaro Ishiwari, Kazunori Yuasa, Sukeaki Yamashita, Kozo Miyake and *Sadao Kimura*

(K. Kimura Labaratory)

With the same apparatuses as those have been used to measure the Q-value of N^{14} (n, p) C^{14} reaction (Rep. Inst. Chem. Res., Kyoto Unive., **19**, 19 (1949)), we studied the energy distribution of emitted charged particles of low energy region from nitrogen gas irradiate by thermal neutrons.

Two peaks were found at 0.28 MeV and 0.42 MeV. The half width of the peak corresponds to about 0.07 MeV, which almost comes from the amplifier noise. Consequently the appearance of the peak is broad. The lower peak is covered a little by the gamma-ray disturbances.

The change of the energy distribution curve of emitted charged particles with the increase of the thermal neutron flux was studied by changing the paraffin wall geometry, but no distinguished variation was found except the rapid increase of 0.6 MeV proton peak of the N^{14} (n, p) C^{14} reaction and the background due to the edge effect and wall effect of it.

The two peaks also suffered no distinguished change with 1 mm Cd absorber applied around the counter wall.

From these results we can consider that these peaks are not due to thermal neutrons, but to somewhat higher energy neutrons.

Further studies are now being continued.

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2. On the Positively Charged Particles Accompanying the β-Decay of P^{32}

Takuji Yanabu, Jiro Muto and *Keigo Nishimura*

(K. Kimura Laboratory)

A cloud chamber with 17cm diameter and 3.5cm height was constructed. P^{32}, in the form of $NaHPO_4$, was sealed in a glass capillary tube of 2mm diameter

and 8mg/cm^2 thick, and placed at the center of this chamber, Stereoscopic photographs were taken by using two vertical mirrors. The magnetic field was about 500 oersted. The aim of the present experiment was to ascertain the existence of positive particles accompanying the beta-decay of P^{32}, on which Sizoo (1940), Groetzinger (1946), Chao (1947), Rogers (1948), and Scott (1949) have already reported. Many cautions were paid in analysing the Wilson chamber photographs, since tracks caused by negative particles moving towards the source might be mistaken for those of positive particles. To examine the reliability of the analysis of tracks, the following two ways were undertaken. (a) $H\rho$-distributions of negative tracks were plotted and compared with the known results. (b) The so called fictitious and concentric source spot method developed by Spaa and others in 1950 was applied to ascertain whether the positive tracks truely represented the positive particles or not.

The results obtained are listed in the following table,

TABLE I

Number of photographs	Number of beta-ray tracks	Number of positive tracks	Ratio of positives to negatives
348	2093	6	0.3%

$H\rho$-values of those positive particles were 1675, 2024, 2240, 2420, 3220 and 3910 oersted-cm respectively. These tracks seemed apparently to be those of positrons because the track density was similar to that of electron. If they were positrons, they should be assigned to the positrons of the pairs produced by some mechanism, since the positron decay is energetically impossible for P^{32}. According to the theoretical discussion given recently by Nambu and Nakano (now in press), some P^{32} decay to the excited state of S^{32} and then this state transit to the ground state by nuclear pair creation, since the gamma-ray emission is forbidden in this case. They obtained the value e^+/e^- to be about 0.13%, which is roughly in agreement with our experimental result.

More detailed experiments are now in progress.

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3. Measurement of the Coefficient of Friction by the Photo-elastic Method. (II)

Yoshiaki Uemura and *Munezo Takai*

(K. Kimura Laboratory)

In the previous report, we pointed out that we could observe directly the effect of the friction near the contact surface by the photo-elastic method. (This Bull. **23**, 15 and 53, (1950))