It is noted that the results with the elements whose atomic numbers lie between $_{73}$Ta and $_{81}$Tl apparently differ from theory. It is improbable that this deviation would be due purely to experimental errors. If the entire deviation observed were assigned to inaccuracy in theoretical knowledge, it would be reasonable to attribute the disagreement to some insufficiency in the Klein-Nishina theory of the Compton effect, since the contribution of the photoelectric effect and pair production is much smaller than that due to the Compton effect for this energy.

Details will be published elsewhere on completion of the work.

---

5. On the Backscattering of β-Rays from C^{14} and P^{22}

Sakae Shimizu, Hiromu Nakamura and *Isao Kumabe*

(K. Kimura Laboratory)

We have observed the phenomena of backscattering of β-rays from C^{14} and P^{32} with the backing of several materials by the use of an end-window G–M counter with a mica window (2.8 mg/cm^2). The source C^{14} was mounted on a collodion film (0.1 mg/cm^2) and P^{32} on a zapon film (0.02 mg/cm^2) respectively. In the latter case insulin solution was used to make uniform the thickness of the source. The source was placed about 3 cm under the window of the counter.

The experimental results obtained are as follows:

1) The amount of backscattering changes with the thickness of backing materials (Al, Pb). In each case a saturation value exists. The values are (110±1)% for Al-backing with C^{14}, and (128±1)% for Al-backing and (183±1)% for Pb-backing with P^{32}, respectively (Table I).

2) The saturation value changes monotonously with the atomic number of the backing materials (Table II).

3) We observed the energy spectrum of β-rays from C^{14} and P^{32} by the absorption in Al and found that the percentage of the lower energy part increased in the case of Pb-backing (Table III).

Table I. Amount of backscattering.

C^{15}		P^{32}			
Al-backing (mg/cm^2)	percent	Al-backing (mg/cm^2)	percent	Pb-backing (mg/cm^2)	percent
0.00	100.0	0.0	100.0	0.0	100.0
1.24	103.3±1.5	19.2	108.5±1	18.5	138.2±1
3.11	105.4±1.5	38.1	114.3±1	55.5	170.3±1
4.35	107.3±1.5	57.6	120.2±1	92.5	178.3±1
5.91	108.5±1.5	74.6	121.7±1	129.5	182.5±1
11.48	110.0±1.5	91.7	127.2±1	185.0	184.5±1

17.11	110.1±1.0	108.4	126.7±1	240.5	181.9±1
		125.6	125.9±1	370.0	183.6±1
		142.3	129.5±1		
		274.6	128.7±1		

Table II. Saturation backscattering (%).

Source	Backing materials								
	None	$_6$C	$_{13}$Al	$_{29}$Cu	$_{48}$Cd	$_{50}$Sn	$_{74}$W	$_{82}$Pb	Glass
C^{14}	100.0	—	110.1±1	118.3±1	—	126.7±1	139.3±1	140.2±1	108.5±1
P^{32}	100.0	114.1±1	127.0±1	149.0±1	165.3±1	166.0±1	—	182.9±1	125.5±1

Table III. Energy spectrum of P^{32} with and without Pb-backing.*

Energy region of β-rays expressed by range in Al. (mg/cm²)	Counts of β-rays (arbitrary unit) Pb-backing	No-backing	Difference
0～40	676	200	476
40～80	1400	600	800
80～120	1800	920	880
120～160	1600	1030	570
160～200	1470	920	550
200～240	1230	740	490
240～280	950	650	300
280～320	680	470	210
320～360	520	365	155
360～400	370	290	80

* The thickness of this Pb-backing is 2mm, which is much thicker than that gives saturation backscattering.

---

6. On the Rolling and the Recrystallization of Aluminium

Masashige Koyama

(Uchino Second Laboratory)

The inner structure of metals and alloys in the pulverized or rolled state, especially of those, iron, nickel, copper and brass has been examined with X-rays in our laboratory.

In the present work, the relation between the reduction percentage and the hardness of the rolled aluminium plates as well as the variation of hardness with the annealing temperature was studied. Meanwhile X-ray analyses were also carried out concerning those items, the fibre structure of several aluminium plates,