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INTRODUCTION: Transmission positron images have been obtained at Teikyo University of Science and Technology using a sealed ^{22}Na of 100 micro Ci. At Research Reactor Institute, Kyoto University, we obtain transmission electron images using ^{204}Tl . ^{22}Na emits “white positrons” (beta plus decay) and ^{204}Tl emits “white electrons” (beta minus decay). At Teikyo University of Science and Technology, 200-kV transmission electron microscope was also used to obtain 200-kV transmission images. The transmission coefficients are compared.

EXPERIMENTS: Tl was irradiated by neutrons in KUR to form ^{204}Tl . ^{204}Tl emits electrons with continuous energies (“white”). ^{204}Tl was placed above a sample which was set on a imaging plate and exposed for 12 hours. Similar experiment using ^{22}Na instead of ^{204}Tl was performed at Teikyo University of Science and Technology. The same aluminum foils were inserted in a transmission electron microscope at Teikyo University of Science and Technology was performed.

RESULTS: Figure 1 shows an imaging plate image by ^{22}Na . The horizontal lines indicate the place where the values of PSL were measured. The values are shown as a wiggling lines. The numbers just above the horizontal lines show the number of sheets of aluminum transmitted. Figure 2 shows a similar imaging plate image by ^{204}Tl . Figure 3 show a similar imaging plate image through 200-kV electrons in a transmission electron microscope. From Figs. 1, 2 and 3, the transmission of beta plus, beta minus and 200-kV electrons are given in Table 1.

In Fig. 4, Log10PSL vs. number of aluminum foils (13 μm each) is plotted.

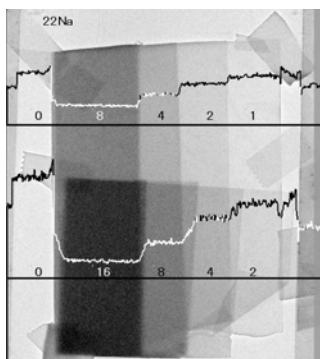


Fig. 1. Imaging plate image using ^{22}Na . PSL was taken along the horizontal lines. The numbers just above the horizontal lines are the number of aluminum foils.

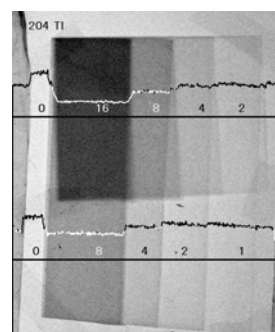


Fig. 2. Similar to Fig. 1, but decayed electrons emitted by the decay from ^{204}Tl was used. The wiggling lines show PSL values.

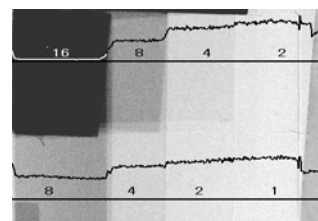


Fig. 3. Similar imaging plate image using 200-kV electrons.

Table 1. Transmission by β^+ , β^- and 200kV electrons

No. Al Foils	Al Foil Thickness Micro m	^{22}Na	^{204}Tl	Elec. Microscope
1	14	0.951515	0.774834	1.000000
2	28	0.775758	0.774834	0.9545205
4	56	0.600000	0.728477	0.8013700
8	112	0.363636	0.582781	0.5136999
16	224	0.157576	0.331126	0.0273970

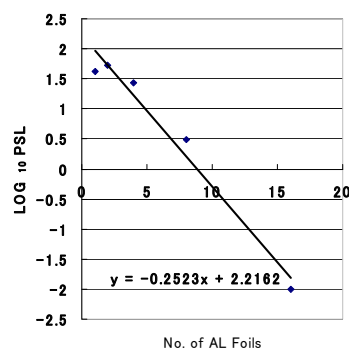


Fig. 4. A plot of number of aluminum foils vs. logarithm of PSL calculated from Fig. 1.