

RADIOGRAPHY WITH HIGH SCHOOL STUDENTS USING NATURAL RADIOISOTOPES

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ABSTRACT

At the last PBNC Conference in October 1996, we presented a report "Use of natural radioactivity distribution images of vegetables at public meetings". Such images were taken by using Imaging Plate (IP) which has a very high sensitivity to radiation; up to 1000 times compared with conventional X-ray films. The IP was exposed to vegetable or meat for about 20 days or more in a heavy shielding box with a thickness of 10 cm whose inner surface was lined with resin. The latent images in the IP were read with a readout machine and then printed. After the conference, the pamphlets with such images were distributed in some countries such as to high school physics teachers in Canada, to the public in Korea, and the U.S.A.

We thought that if it is possible for high school students to take such images of natural radioactivity distribution by themselves, it would be more effective, than only looking at the images, for them to realize that there are many radiations and radioisotopes in our circumstances, even in our own bodies.

We found that it is possible to take autoradiography using IP, even without a heavy shielding box, when we use tangle or a potassium compound which contains potassium in high concentrations. Tangle contains potassium more than 10 times that of ordinary vegetables, and potassium compounds contain more than 10 times that of tangle. Since tangle is obtainable in city markets, and potassium compounds can be found in ordinary chemical laboratories in high schools, it is possible to take autoradiographies of such materials even in high schools without a heavy shielding box, although it is necessary to cooperate with a laboratory that has the imaging plate readout machine, which we can nowadays find in some research laboratories and hospitals. When materials such as tangle or potassium compounds are used as a radiographic sources, it is possible to take radiographs, not autoradiography of natural radioactivity distribution, of some materials such as coins, electronic parts, plastic or paper products, etc. We made a plate from a mixture of potassium fluoride and adhesive paste with a dimension of 20cmX25cmX0.3cm, which is a very good natural radioactive source for radiography.

It is very important for students to realize various scientific facts of nature through their own experiences. We are doing cooperative work on "Radiography using natural radioisotopes" between ourselves and high school teachers and students, and the laboratory where they have the IP readout machine, in this case the Radioisotope Research Center of Nagoya University.