

Studies on the Possibility of Determination of Uranium and Thorium Concentration in the Thai Monazite Ore Processing Samples Using Gamma-ray Spectrometry Technique

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The possibility of the determination of U and Th concentration in the Thai monazite ore processing samples using gamma-ray spectrometry technique was investigated. The studied samples were monazite ore, tri-sodium phosphate, mixed rare earth hydroxide, enriched cerium, uranium cake, thorium cake, La_2O_3 and CeO_2 . The measured activity concentrations of ^{238}U and ^{232}Th were converted into the concentrations of U and Th under the assumption of secular equilibrium. The results showed that the major daughter nuclides found in the studied samples, were ^{214}Pb ^{214}Bi and ^{226}Ra for ^{238}U series with additional radionuclides of ^{228}Ac , ^{212}Pb , ^{208}Tl and ^{212}Bi for ^{232}Th series. The concentrations of U and Th estimated via each daughter products of their series were not significantly different for all samples. Wavelength Dispersive X-ray Fluorescence (WDXRF) with different sample preparations (loose powder, pressed pellet and fused bead methods) was also used to determine the concentrations of both U and Th in these samples. A good agreement between the concentration of U and Th measured by gamma-ray spectrometry (U = 0.42 wt%, Th = 6.54) and WDXRF prepared by fused bead method (U = 0.41 wt%, Th = 7.37) was observed for monazite ore sample.

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