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Investigation of mobility of plutonium in environmental and nuclear waste samples using sequential extraction

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Fractionation of plutonium isotopes (²³⁸Pu, ^{239,240}Pu) was conducted for environmental samples including soil and sediment, and bio-shielding concrete from decommissioning of nuclear reactor in this work. The fractionation were carried out by dynamically sequential extraction system using an on-line sequential injection (SI) combined with a specially designed extraction column. Plutonium in the fractions from the sequential extraction was separated by ion exchange chromatography and measured using alpha spectrometry. Different distributions of plutonium in environmental samples and bio-shielding concrete were observed. The analytical results show a higher mobility of plutonium in concrete sample than in environmental samples analyzed in this work, which means attention should be paid to the treatment and disposal of low level concrete waste from decommissioning of nuclear facilities.

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