

Automated Radiochemistry for Environmental Radioactivity

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As the number of nuclear power plants under construction or planned increases, the demand for environmental radioactivity monitoring has been increased to ensure the safety of nuclear energy. For the routine monitoring, a large volume of sample is needed for quantifying the level of radionuclides due to their trace levels. Additionally, the alpha and beta emitters including ^{90}Sr , ^{241}Am , Pu isotopes and others require chemical separation. With the development of extraction chromatography technique for specific radionuclides, automated radiochemistry has been increasingly adopted in radiochemical laboratories.

We studied a straightforward and rapid method to determine ^{90}Sr by measuring its daughter ^{90}Y in various environmental samples (e.g., soil, sediment, biota, and seawater) using an automated separation instrument with DGA resin. While ^{137}Cs can be easily analyzed by HPGe detector, its determination, especially in seawater, often requires pretreatment such as sample volume reduction and additional chemical separation. However, employing a Cs-specific ion exchange resin (e.g., AMP-PAN resin) along with automated techniques significantly simplifies ^{137}Cs analysis in seawater.

In this presentation, we will introduce how these automated radiochemistry techniques can significantly enhance the efficiency and accuracy of environmental radioactivity analysis in laboratories.

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