Abstract Submitted
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On the Radiochemical Separations of the Beta-emitting Fission Products[1] ZHENG CHANG, South Carolina State University, RALF SUDOWE, University of Nevada, Las Vegas — This research aims at developing fast and effective radiochemical procedures for separation of the beta-emitting fission products that are difficult to analyze by gamma-spectrometry. Post-detonation analysis, as one of the major tasks of nuclear forensics, can provide crucial information for identification of the explosion levels, fuel sources, and industrial processes of a nuclear device. However, a dozen of radionuclides with high fission yields such as Zr-93, Tc-99, Sr-90 are either pure beta-emitters or only emitting gamma-rays that are difficult to analyze. Although the analysis of these radionuclides was thoroughly studied, samples from unknown nuclear detonations can be complicated by the number of fission products, radioactivity levels, sample matrices, and time limits for analysis. The challenge facing the forensic analysis should not be underestimated. A sequential separation procedure is designed to analyze the major beta-emitting fission products. Radiochemical techniques such as solvent extraction, precipitation, and column chromatography are utilized. The procedure will be tested and improved by experiments. The final procedure should be capable of analyzing the fission products under various sample conditions effectively and rapidly.

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Daniel M Smith Jr
South Carolina State University

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