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Nuclear Forensic Science: A Tool for Mitigating Environmental Impact and Risks Associated with Nuclear Wastes

Nuclear Forensic Science (NFS) plays a crucial role in enhancing nuclear security, primarily through the detection and attribution of illicit nuclear materials. However, its application in nuclear waste management remains underexplored. Inadequate disposal and poor tracking of nuclear waste pose significant environmental and public health risks, especially in regions with limited regulatory oversight. This study intends to investigate the potential of NFS techniques to mitigate environmental threats associated with nuclear wastes. Analytical methods such as isotopic ratio analysis, rare earth element (REE) profiling, trace element analysis, and radiochemical dating will be applied to determine the origin, composition, and transport pathways of nuclear wastes. These tools can help identify sources of contamination, trace unauthorized disposal activities, and assign responsibility to relevant parties. By integrating NFS into nuclear waste management frameworks, regulatory bodies can improve accountability, ensure compliance with international standards, and prevent future environmental contamination. In conclusion, NFS can offer a promising pathway for strengthening environmental protection and promoting responsible nuclear practices through enhanced waste traceability and oversight.

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None

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