

Public Abstract

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Graduation Term:SP 2015

Department:Chemistry

Degree:PhD

Title:Radiochemical and Analytical Methods of Analysis of Radiological Dispersal Devices

The events on September 11th 2001 and subsequent attacks in America and around the world have brought a renewed interest in the nation's security including the concern over the use of a nuclear or a radiological dispersal device (RDD). Research has been done in two separate projects in order to help address some of these concerns. A research assistantship from Savannah River National Laboratory was granted in order to identify the unique characteristics of radioactive ^{192}Ir materials (chapters 2-4). A method for the dissolving of the iridium with electrochemistry was developed and used for sample preparation for analysis. Mass spectrometry (ICP-MS) analysis was then used to identify and quantify impurities and isotope ratios in iridium from various locations across the country. The second research project has developed a series of nanoparticles for use as tagging and tracking explosives (chapters 5-7). The composition of the nanoparticles were created with lanthanides with varying composition to provide a unique signature that can be rapidly and precisely measured in the field via neutron activation analysis. The nanoparticles could be used as a real-time in the field method for tracking and identifying materials such as explosives in a post detonation scenario.