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DETECTION OF NUCLEAR MATERIAL WITH MOISTURE CONTENT BY USING LIBS TECHNIQUE

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To improve the proliferation resistance in nuclear fuel recycling technology, it is crucial to develop an elemental analysis method of molten salt composition in real-time. However, the analytical performance is greatly influenced by its moisture content in molten salt. While spent nuclear fuel treatment processing has been produced for decades, this process conducts experiments within a hot cell due to high heat emitting nuclides and a radioactive environment. Therefore, many researchers have worked inside hot cell as harsh environment for monitoring the process. This method is simple, but a very dangerous activity due to the highly radioactive material inside. Hence, in this study, the effects of moisture content variation on the properties of the laser induced breakdown spectroscopy (LIBS) and its spectral signals were investigated using the molten salt composition with different moisture contents. The spectra of hydrogen intensity showed a higher peak position with increasing moisture content according to the laser power increasing. The work looked at using a pulsed Nd:YAG laser operating at a fundamental wavelength of 1,064 nm in 50 mJ power. In order to artificially add an exact amount of moisture to the KF-LiF-ZrF4 mixed composition, two vials were used which are linked by tube. The vials were sealed with vacuum grease and high strength adhesive

Biography

Seunghyun Kim has completed his PhD from Chungnam National University in Korea and postdoctoral studies from Virginia Commonwealth University in USA. Currently, he is serving as the Senior Researcher of KORAD for spent nuclear fuel management.

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