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Radiation monitoring utilizing radiophotoluminescence in glass dosimeter

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Silver (Ag⁺)-doped phosphate glass after exposure to ionizing radiation has an intense luminescence by excitation with ultra-violet light. This phenomenon is called radiophotoluminescence (RPL). The RPL emission spectrum includes two emission bands such as yellow band at about 560 nm and blue band at about 460 nm. The RPL intensity was increased linearly with increasing x-ray irradiation dose up to about 1000 Gy. Small amount of bead-type RPL glass as large as about 50 μm was well prepared with a jet flame system, which was composed of a nozzle, a powder feeder and gas cylinders. It was confirmed from gamma-ray irradiation experiments that RPL glass beads could be used as radiation dosimeters and for visualization of radiation dose utilizing RPL phenomenon as shown in Fig.1. The flexible RPL glass sheet was prepared using glass as large as about RPL glass beads. This sheet is expected to be useful for radiation imaging. In this paper, visualization of radiation dose distribution is demonstrated using the flexible RPL sheet. The research on the radiation monitoring using the beads-type and sheet-type glass dosimeters in contaminated area of Fukushima NPP-1 as shown in Fig.2 is in progress.

Biography

Hidehito Nanto has completed his PhD in Nuclear Engineering from Osaka University and is a Visiting Scientist at the Research Laboratory of Electronics, MIT. He was the Director of Adv. Mater. Sci. R&D Center, Kanazawa Institute of Technology as a full Professor. He has published more than 250 papers in reputed journals and has been serving as an Editorial Board Member of the Sensors and Materials.

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