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P2.22: Alpha-ray Imaging with Alkali Copper Halide Scintillator

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Radiation monitor is an important technique for the decommissioning of the Fukushima Daiichi Nuclear Power Plant (FDNPP) with safety, and the internal exposure of workers who inhale alpha-emitting dust, such as plutonium dioxide particles, in nuclear facilities is a crucial matter for human protection from radiation. Detailed information on the radiation dose distribution and alpha-emitting dust inside the nuclear reactor is necessary to operate the decommissioning of FDNPP. Thus, we have developed an alpha-ray imaging detector with high positional resolution consisting of a scintillation sheet, optical microscope and Complementary Metal Oxide Semiconductor (CMOS) camera (ORCA-Flash4.0 V3, Hamamatsu).
To obtain the high-resolution imaging, high-light output scintillator is required, and Cs3Cu2I5 (CCI) was selected as the scintillator for the alpha detector in this time owing to a high light output of 41,500 photon/MeV. Moreover, this material has been applied to high-resolution X-ray imaging techniques. In this paper, we show the feasibility study on the application of the CCI scintillator for alpha-ray imaging.

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