Investigation on basic physical and chemical properties of radio-Cs micro particles

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The 2011 Fukushima Daiichi Nuclear Power Plant (F1NPP) accident caused several significant releases of radioactive particulates into the environment.The physical and chemical properties of these particles, which have not been known before,have been an area of significant study. It is suggested that these fine particulates could also remain,in significant amounts,inside the nuclear reactor cores where the accidents occurred. Though appropriate samples cannot currently be obtained from the inside of the stricken reactor cores, radioactive particles collected near to the site serve as a valuable evidence for elucidation of the accident events for each reactor unit explosion and as micro-scale samples of the residual fuel debris inside the reactors. Study of these particles can help to better establish an acceptable procedure for decommissioning (collection of molten fuel, etc., decontamination inside the reactor, safety of workers, etc.). Thus, it is necessary to investigate the physical and chemical properties using advanced micro-scale analytical methods, at the same time as examining effective separation and collection methods for the radioactive particles based on the obtained property information. This will all contribute to risk reduction of the whole "decommissioning" plan. Thus, we started the analysis of such radioactive particles by using the state-of-the-art technologies such as micro-X-ray analysis, Kelvin force microscopy, induced flourescent microscopy, etc. along with radiochemical analysis.

