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Surface Decontamination Studies of Cs-137 and Sr-85 Using Polymer Gel

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Strippable polymer coating is one of the methods for effective surface decontamination to remove isotopes on the contaminated surface. This method is applying in nuclear facilities on the World. In this paper, we present the results obtained in our laboratory from product the polymer coating to apply to remove radioisotopes of Cs-137 and 85-Sr from surface of glass, stainless steel, mild steel, ceramic, PVC plastic.

This polymer gel solution consist of water soluble polymer preferably polyvinyl alcohol (PVA), plasticizing agent (glycerine) and chelating agents, (citric acid) which can be sprayed or pasted on to contaminated surface. After some hours, these gel solutions was dried to form a strong thin film and it was easily peeled off from a contaminated surface with the radioactive isotopes and can be disposed off as radioactive solid waste. In this study infrared spectrophotometry technique was used to examine the interaction of the cesium and strontium ions with polyvinyl alcohol (PVA), polymer gel and the results of the study were also presented. The results showed that decontamination efficiency of Cs-137 and Sr-85 strongly depended on property, porosity and smoothness of the contaminated surface and obtained from 95- 99 % on glass and stainless steel, ceramic and PVC plastic surfaces. The decontamination efficiency also depended on activity and coating thickness. Optimization of film thickness is around 0.2mm. Decontamination efficiency of Polymer gel were compared with Decongel 1101 (product from USA) on surfaces. IR spectra studies indicated that Cs and Sr ions interacted with PVA and citric acid in Polymer gel through cacboxyl(C=O) group. Polymer gel could remove of Sr-85 and Cs-137 better than PVA gel does because of citric acid, which can form chelating complex with Cs and Sr ion.

Country or International Organization

Vietnam

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