

Cerium Analysis for the Oxidation of Cerium-containing Foam Decontaminant

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A foam decontaminant is composed of a surfactant and nanoparticles for the generation and maintenance of foam, and a chemical decontamination agent made of cerium ion(Ce(IV)) dissolved in nitric acid or sulfuric acid. Ce(IV) will be reduced to Ce(III) through the decontamination process. Oxidizing Ce(III) can be reused as a decontamination agent, Ce(IV). The study was undertaken to determine whether the potentiometric titration method can be used for an analysis of the Ce(IV) concentration in the foam decontaminant containing surfactant.

The presence of silica nanoparticles and the surfactant has no effect on an analysis of Ce(IV) concentration by the potentiometric titration method using Fe(II), regardless of the concentration of TBS. The same inflection point appeared in the potential at which 20ml of a Fe(II) solution was added, in both 2M nitric acid and 2M sulfuric acid medium. Thus, it is possible to determine the Ce(IV) concentration by the potentiometric titration method using Fe(II) in a 2M nitric acid or sulfuric acid medium. It was confirmed that a Ce(IV) concentration analysis in cerium-containing foam decontaminant is valid by this potentiometric titration method.