



Title of abstract: Application of X-ray Absorption Spectroscopy (XAS) to Nuclear Waste Management

Authors

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Abstract

X-ray absorption spectroscopy (XAS) is a sensitive probe routinely used for elucidating the speciation and environment of a given element in a wide range of materials. Elemental speciation and local environment govern many properties including (radio)element incorporation, material solubility and elemental migration. Understanding these properties is fundamental to building a robust safety case for the use of materials as nuclear wasteforms. Here we describe recent efforts in two areas: (a) the application of XAS in ceramics to understand the incorporation of actinides (U, Th) to support the Nuclear Decommissioning Authority (NDA) mission to manage the UK's civil plutonium inventory¹ and (b) investigation of radionuclide sequestration in partially crystalline or amorphous cementitious and geopolymeric materials where historically XAS has been a less widely utilized structural probe.

¹<https://www.gov.uk/government/news/nda-funds-plutonium-ceramics-academic-hub-with-universities>