

Development of radiochemical analysis strategies for decommissioning activities

Thursday, 29 September 2016 09:00 (0:20)

Content

Decommissioning of the oldest nuclear power reactors is one of the most challenging technological legacy issues many countries will face in forthcoming years, as many power reactors reach the end of their design lives. These activities generate large amounts of waste that need to be classified according to their radioactive content. Approximately 10 % of the contaminated material ends up in different repositories (depending on their radioactive content) while the rest is decontaminated, measured and released into the environment or sent for recycling. Classification and control need to be done accurately in order to ensure that both the personnel involved and the population at large are not needlessly exposed to radiation or radioactive material and to minimise the environmental impact of such work. However, too conservative classification strategies should not be applied, in order to make proper use of the limited space available for radioactive waste repositories.

The information required by national authorities, especially in the early stages of the decommissioning process, includes a great number of radionuclides which, in the case of alpha and beta emitters, can only be determined after a radiochemical separation process.

The paper presents the work carried out in the framework of the European Union funded project "Metrology for Decommissioning of nuclear facilities" (MetroDECOM) and deals with the development of procedures for the simultaneous determination of alpha and beta emitters in three matrices: concrete, steel and graphite. On the basis of individual sample treatment strategies which ranged from borate fusion to microwave assisted acid digestion depending on the different chemical properties of these matrices, we have worked to make these procedures merge in a common radiochemical analysis scheme based on extraction chromatography tandem arrangements for the simultaneous separation of up to four radionuclides.

In this presentation, the different methods will be described and the most significant achievements and pitfalls observed in the development and validation process will be discussed.

About the Presenter

PhD in Chemistry specialised in environmental radiochemistry and quality assurance. He works since 2012 at the Environmental Radioactivity Group of PTB in Braunschweig (Germany) and has been involved in diverse European Union funded research projects.

Primary author(s) : Dr. ZAPATA-GARCÍA, Daniel (Physikalisch-Technische Bundesanstalt, PTB)

Co-author(s) : Dr. WERSHOFEN, Herbert (Physikalisch-Technische Bundesanstalt, PTB)

Presenter(s) : Dr. ZAPATA-GARCÍA, Daniel (Physikalisch-Technische Bundesanstalt, PTB)

Session Classification : Radiochemical Techniques

Track Classification : Radiochemical Techniques