



Contribution ID: 930

Type: Verbal

## Investigation of a new approach for $^{36}\text{Cl}$ determination using plastic scintillators

*Tuesday, 17 May 2022 09:40 (20 minutes)*

$^{36}\text{Cl}$  is one of the important radionuclides to be controlled in view of radioactive waste disposal from nuclear infrastructures. Determination of  $^{36}\text{Cl}$  is challenging due to its volatility, low activity concentration in de-commissioning samples and the lack of solid reference materials for method validation.

In this paper, a new approach to determine  $^{36}\text{Cl}$  in solid samples by using plastic scintillator microspheres (PSm)/resin (PSresin) was examined. The main advantages of using PSm/PSresin are the decrease of the turnaround time (TAT) of the analysis procedure since the PSm/PSresin with the radionuclide adsorbed can be directly measured by liquid scintillation counting (LSC) and avoiding mixed wastes.

Samples were pyrolysed to release  $^{36}\text{Cl}$  with the Trio-Furnace Pyrolyser from RADDEC. Different set-ups were investigated for trapping and/or separating this  $^{36}\text{Cl}$ . Two different approaches were investigated using respectively plastic scintillation microspheres (PSm) and plastic scintillating resins (PSresin). With the PSm, two different set-ups for trapping  $^{36}\text{Cl}$  from the pyrolyser were tested: 1) using the PSm directly as a trapping material and 2) mixing the PSm with the trapping solutions ( $\text{H}_2\text{SO}_4$  and  $\text{Na}_2\text{CO}_3$ ) after applying the combustion procedure. With the PSresin (TK-TcScint), a selective scintillating resin normally used for  $^{99}\text{Tc}$  determination, was tested using a set-up where the trapping solutions ( $\text{H}_2\text{SO}_4$  and  $\text{Na}_2\text{CO}_3$ ) were loaded into the cartridge containing the PSresin, which was placed into a LS vial and directly measured by LSC. This paper will present and discuss a comparison of the chemical recoveries of  $^{36}\text{Cl}$  obtained using the various approaches and set ups.

**Primary author:** LLOPART, Ines (SCK CEN)

**Co-authors:** Dr VASILE, Mirela (SCK CEN); Dr TARANCÓN, Alex (UB); Dr BAGÁN, Héctor (UB); Dr DOBNEY, Andrew (SCK CEN); Dr BODEN, Sven (SCK CEN); Dr BRUGGEMAN, Michel (SCK CEN); Dr LEERMAKERS, Martine (VUB); Dr QIAO, Jixin (DTU); Dr WARWICK, Phil (University of Southampton)

**Presenter:** LLOPART, Ines (SCK CEN)

**Session Classification:** Nuclear Analytical Methods

**Track Classification:** Nuclear Analytical Methods