

# DETERMINATION OF $^{210}\text{Po}$ BY ALPHA SPECTROMETRY USING CLOUD POINT EXTRACTION

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Polonium-210 is one of the most concerning radionuclides for man. The major part of  $^{210}\text{Po}$  found into the different compartments of our environment origins from natural sources, this radioisotope being part of  $^{238}\text{U}$  decay series. From its ubiquitous nature,  $^{210}\text{Po}$  can affect a wide range of ecosystems, mainly aquatic environments and water supplies.[1] This radiocontaminant can be naturally released, amongst other processes, from radon-222 emanations or via decay of dissolved radium-226 present in sea water.[2] On the other hand, human activities, including power plants, phosphate or uranium mining, can also release locally significant amount of  $^{210}\text{Po}$ ,[3] resulting in contamination of surrounding aquifers as well as food chain.[4] Polonium-210 has also been known to cause severe effects on human cells and DNA due to its highly radioactive nature and high kinetic energy. Its radiotoxicity translates into extremely low maximum acceptable concentration of  $^{210}\text{Po}$  for drinking water (100 - 200 mBq L<sup>-1</sup>), the lowest among the naturally occurring radionuclides, prescribed by national (Health Canada) and international (World Health Organization (WHO)) regulators.[5-6] This last feature pose a challenge for its rapid and precise determination by radiometric approach.

The purpose of this research is to highlight the a novel analytical technique, cloud point extraction, that is well-suited for radioanalytical measurements as it is environmentally benign while being simple to perform, rapid and inexpensive. The extraction performances of two DGA analogs will be highlighted. The coupling of CPE with alpha spectrometry ( $\alpha$ -spec) to achieve the necessary sensitivity in order to carry out the analysis of  $^{210}\text{Po}$  in the ultra-trace state, while maintaining a good sample throughput, will also be described. Finally, the figures of merit of the proposed radioanalytical methodology will be presented.

## References

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