ANALYSIS OF TECHNETIUM AND ITS SPECIATION IN SEAWEED SAMPLES BY INDUTIVELY COUPLED PLASMA MASS SPECTROMETRY

Keliang Shi*, Xiaolin Hou2, Wangsuo Wu3

1 School of Nuclear Science and Technology, Lanzhou University, Lanzhou 730000, China, shikl@lzu.edu.cn
2 Center for Nuclear Technologies, Technical University of Denmark, DK-4000 Roskilde, Denmark, xihao@dtu.dk
3 School of Nuclear Science and Technology, Lanzhou University, Lanzhou 730000, China, wws@lzu.edu.cn

Because of the high fission yield, high mobility and long half-life, 99Tc is considered to be one of the most important radionuclides in environmental trace application as well as nuclear waste management (Ref.1, 2). The study on the determination of technetium and its speciation is therefore a key issue for understanding its fate and behavior in ecosystem. The present work mainly focused on the analytical method developed of 99Tc and its speciation in seaweed sample. Considering the special chemical property of technetium, the stability of technetium during dry ash of seaweed and evaporation of sample solution was investigated and the corresponding pre-treatment procedures were proposed. To remove the interferences of ruthenium and molybdenum, extraction chromatographic techniques using TEVA column was applied (Fig.1). For speciation analysis, different species of technetium were separated using biochemical techniques and detected by ICP-MS after sample pre-treatment and purification of technetium using extraction chromatographic technology. The developed methods were proved to be reliable and have been successfully applied for the determination of 99Tc as well as its speciation in environmental seaweed samples.

Fig.1. Sorption and elution behaviors of technetium, ruthenium, and molybdenum in extraction chromatographic separation using two small TEVA columns (1.5 mL for each).

ACKNOWLEDGMENTS

The financial support from the National Natural Science Foundation of China (21301083, J1210001, 41472229) is gratefully appreciated.

REFERENCES