2 - 40 Determination of Iodine in Solution Using Energy Dispersive X-Ray Fluorescence Spectrometer

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^{99}Tc, ^{127}I, ^{237}Np and ^{241}Am are high-toxic and long lived-radionuclides in nuclear fuel waste. If these nuclides are transformed into short-lived or stable nuclides in ADS transmutation process, the waste has lower radiotoxicity. The rapid analysis of these nuclides before and after transmutation becomes very important. XRF is a very simple analytical technique: X-rays excite atoms in a sample, which emit X-rays at energies characteristic of each element. A detector measures the energies and intensities of the emitted X-rays. From this, one deduces which elements are present and their concentrations. In this work, we use stable iodine replace radio iodine to establish the rapid analysis method of iodine by XRF in solution[1-3].

The K characteristic rays of iodine are K_α(28.61 keV) and K_β(32.29 keV) (Fig. 1). The intensity of K_α was selected to make the working curve (Fig. 2). The correlation coefficient (R^2) was 0.996. The range of determination is 1～14 g/L.

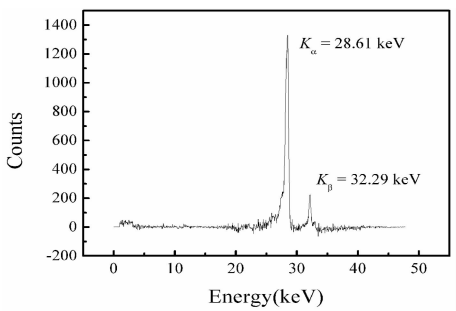

Fig. 1 The K characteristic rays of iodine.

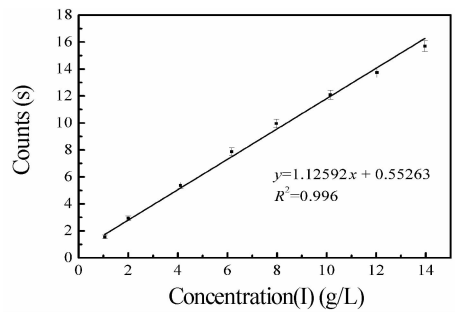

Fig. 2 The working curve.

A certain concentration sample was contained by 10 polyethylene centrifuge tubes (10 mL) and each of these tubes was detected for 100 s. The values were: 6.63, 6.69, 6.55, 6.86, 6.46, 6.59, 6.88, 6.95, 6.63 and 6.66 g/L. The average value was 6.69 g/L and the standard deviation was 0.16 g/L. The relative standard deviation was 2.35%($\bar{x}\pm s$=(6.69±0.16) g/L). The precision of the analysis was good.

It indicated that EDXRF could be a potential simple method for analyzing iodine in solution.

References

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2 - 41 Gas Phase Chemistry of Short-lived W and Os Carbonyls

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Formation of carbonyls in hot atom reactions has recently been pioneered as a powerful tool for future study of some transactinide elements[1]. It was postulated that synthesis of carbonyls at heavy ion accelerators is only possible behind a preseparator. In this study we have investigated carbonyl formation at a

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