2 - 36 Simultaneous Determination of U and Nd by Binary Ration and X-ray Fluorescence Spectrometry

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X-ray fluorescence spectrometry is a powerful tool for the determination of elements in a wide variety of sample matrices[1]. It is a relatively fast method of analyzing the elemental composition of a sample. Specimens placed in the instrument can be in the form of either solids or liquids, and the specimen is neither consumed nor destroyed during the analysis[2]. In the present work, a rapid method for determination of U and Nd in simulative spent fuel by binary ration and X-ray fluorescence spectrometry was developed. The determination of U and Ce in simulative MOX fuel samples by binary intensity ratio and X-ray fluorescence spectrometry has been studied[3].

The method of binary intensity ratio determine the amount of each element by measuring the net intensity of a line of each constituent and making a log-log plot of net intensity ratio *vs.* concentration ratio of each constituent. The relation of the net intensity and the concentration of element is as follows:

$$\log[I(A)/I(B)] = \log K + n\log[C(A)/C(B)] \ ,$$

where I and C are the intensity of a line and the mass concentration of each element, respectively.

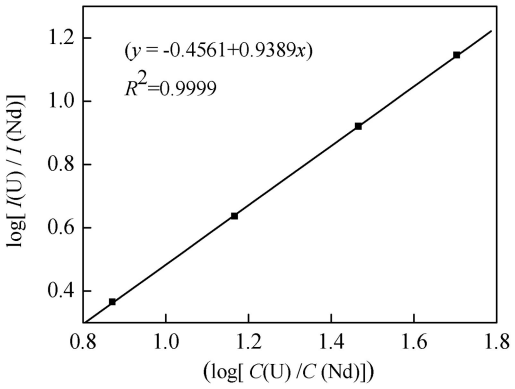

Fig. 1 The calibration curve with binary ration for U_3O_8 -Nd_2O_3mixtures.

Firstly, the calibration curve was established according to the above relation. The standard samples were prepared from U_3O_8 and Nd_2O_3 powders by weighing in suitable proportions and mixing in a Mixer Mill. The U_3O_8-Nd_2O_3 mixtures may be regarded as binary for this study because of the virtually negligible effect of oxygen. The measurement condition by X-ray fluorescence spectrometry in our experiment shows in Table 1. Fig. 1 shows the calibration curve with binary ration for U_3O_8-Nd_2O_3 mixtures, and R^2 is greater than 0.999. Then the amount of each element in the test samples of U_3O_8-Nd_2O_3 mixtures can be deduced by the calibration curve.

Table 1 Measurement condition for analytical elements.

Element	Analytical line	Excite condition		Detector	Measuring time / s
		U / kV	*I* / μA		
U	U La	30	15	CdTe	120
Nd	Nd La	30	15	CdTe	120

References

[1] E. P. Bertin, Anal Chem, 36(1964)826

[2] E. B. Buchanan, Jr. Foo-Chong Tsai, Analytical chemistry, 46(1974)1701.

[3] You Song, Weiming Zheng, GuiJiao Liu, Journal of nuclear and radiochemistry, 27(2005)7.

2 - 37 Desorption of Uranium from Amidoximed Silica

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Previous work suggested that amidoximed silica can be used as a highly efficient adsorbent for uranium removal from salt lake water. In this work, desorption of uranium from amidxoximed silica was investigated.

Amidoximed silica, which were loaded with uranium(VI) from salt lake water were used for desorption studies. 0.1 mol / L of HNO_3 Na_2CO_3, $NaHCO_3$ and NaOH solution were used as desorbing solutions, respectively. The