

CHAPTER V

CONCLUSION



A rapid procedure has been developed for the measurement of uranium in water using thermal neutron activation and anion-exchange separation of the radio-uranium from ethanol/HCl solvent mixture. The analytical results were compared to those obtained by the fluorometric method where uranium was first extracted with ethylacetate and then fused with 0.3 g flux mixture at 600-700°C. The standard deviations quoted for both methods were calculated from the results of four to five separate determinations. The precision of the NAA-technique was distinctly better when the uranium concentration was lower than 20 $\mu\text{g}/\text{dm}^3$. For higher concentration, no great difference in precision between the two methods was observed. An enrichment of 10³-fold for uranium could be obtained by the sample anion exchange technique. Both methods could determine the uranium concentration down to 1 $\mu\text{g}/\text{dm}^3$. A total number of 16 samples could be analysed per man day by the NAA technique. In the case of fluorometry, if sufficient platinum dishes are available, a total number of 50 samples could be easily analysed per man day.

Another advantage of the fluorometric method over the NAA technique is that it can be applied to the analysis

of uranium in sea water without any difficulty. The results of the two techniques agree well with each other, as one can observe from Table 5.1

Table 5.1 Uranium concentrations in water.

samples	uranium content ($\mu\text{g}/\text{dm}^3$)	
	NAA	Fluorometry
DDH-1, 1	27.69 ± 2.07	29.60 ± 5.20
DDH-2, 2	126.15 ± 6.89	126.12 ± 4.63
DDH-3, 3	21.45 ± 1.82	20.68 ± 5.31
DDH-5, 5	19.81 ± 1.64	19.43 ± 6.52
DDH-8, 6	261.86 ± 13.53	265.67 ± 8.81
DDH-9, 7-1	33.20 ± 2.88	33.54 ± 1.75
DDH-9, 7-2	25.28 ± 2.21	25.99 ± 6.04
DDH-10, 8-1	4.16 ± 0.73	4.59 ± 1.93
DDH-10, 8-2	7.96 ± 0.90	8.64 ± 3.37
DDH-11, 9-2	22.12 ± 2.14	22.49 ± 3.51
DDH-12, 10	7.52 ± 0.99	7.68 ± 3.08
DDH-13, 11	38.07 ± 3.13	40.00 ± 3.45
DDH-14, 12-1	20.95 ± 3.27	19.09 ± 2.59
DDH-14, 12-2	224.26 ± 10.83	192.73 ± 9.43
DDH-17, 13-1	42.27 ± 2.75	47.33 ± 1.80
DDH-17, 13-2	43.79 ± 3.97	42.38 ± 5.43
DDH-19, 14	27.69 ± 2.58	26.19 ± 4.45

continue :

DDH-20, 15-1	127.69 [±] 6.98	128.57 [±] 6.73
DDH-20, 15-2	73.57 [±] 4.21	95.71 [±] 7.97
DDH-21, 16-1	594.35 [±] 28.43	590.00 [±] 20.92
DDH-21, 16-2	234.91 [±] 20.46	226.19 [±] 4.45
Phuvieng, Knonkhan	1.61 [±] 0.17	1.47 [±] 0.23
Sea water, Chonburi	N	0.40 [±] 0.06

Note : N = undetectable