CHAPTER IV

CONCLUSION

The contents of thorium and uranium in twelve local monazite samples as obtained by different methods performed in the present work are summarized in Table 4.1 and 4.2 respectively.

Table 4.1

Thorium content of monazite samples from various methods

Sample	Concentration of thorium from NAA % Th	Concentration of thorium (% Th) from radiometric method						% Th from X - ray measurement(b)	% Th from spectro.	% Th from EDTA titration	Ave. value of % Th
		Detector A at 2.61 Mev	Detector B at 2.61 Mev	Detector C at 2.61 Mev	Detector A(a) at 0.91 Mev		Detector A Simul. eq.				
					1st run	2nd run					
Mon.NTL-7A	(8.52)	(8.52)	(8.52)	(8.52)	(8.52)	(8.52)	(8.52)	(8.52)	7.63	7.15	(8.52)
1	6.18	5.37	5.73	-	5.85	5.78	5.34	5.29	-	-	5.65
T	7.16	7.89	8.82	8.74	9.21	9.24	7.54	8.23	-	-	8.35
G_1	6.26	5.73	6.25	-	6.83	6.93	5.96	6.38	-	-	6.33
G_2	5.76	5.93	6.83	-	7.17	7.13	4.92	6.46	-	-	6.31
B	5.76	5.26	5.95	-	-	5.07	5.88	6.04	-	-	5.78
6.1	5.64	5.75	5.68	5.77	6.43	6.23	5.20	6.22	-	-	5.88
7	7.28	6.85	7.40	7.40	8.10	8.11	6.08	7.03	-	-	7.28
9	5.52	5.40	5.65	-	6.38	6.22	5.46	5.90	-	-	5.79
10	6.52	5.75	6.43	-	7.02	6.93	5.56	6.59	-	-	6.40
11.1	6.56	5.99	6.47	-	-	6.06	6.51	7.05	-	-	6.52
11.2	7.43	5.92	6.85	-	7.42	7.43	5.92	7.10	-	-	6.87
A	6.36	6.22	7.15	6.46	7.56	7.28	6.11	6.77	-	-	6.74

Note : (a) Not corrected for contribution of uranium

(b) The analyses were performed by the Physics Division of the Office of the Atomic Energy for Peace

\- Analyses were not performed

Table 4.2

Uranium content of monazite samples from various methods.

Sample	% U_3O_8 from radiometric method (RE was assumed)				% U_3O_8 from gross β-measureme
	Results from γ-measurement at 1.76 Mev	Results from simult. eq.	Results from gross γ-measurement (a)	(b)	
1	0.99	0.60	0.34	0.43	0.29
T	0.51	0.82	0.69	0.68	0.22
G_1	0.41	0.12	0.56	-	-
G_2	0.46	0.15	0.69	-	-
B	0.25	0.25	0.44	0.47	0.22
6.1	0.43	0.49	0.45	0.61	0.44
7	0.47	0.46	0.90	0.91	0.48
9	0.35	0.50	0.43	0.51	0.31
10	0.45	0.74	0.62	0.74	0.27
11.1	0.44	0.08	0.71	0.61	0.34
11.2	0.46	0.62	0.83	0.65	0.39
A	0.04	0.71	1.12	0.80	0.13

Note :- (a) Integration from 80 Kev.

(b) Integration from 340 Kev.

\- Analyses were not performed

The thorium contents of the twelve samples vary between 5 - 8%. The results for one sample as obtained by various methods

may have a difference of about 10%, which is considered to be acceptable for the geological surveying purpose. There are two limitations for the radiometric methods. Assumption that the thorium family in the sample is in RE must be made and a standard ore, in which the thorium-series is known to be in RE must be available. Since some of the activities under the 0.91 Mev peak might be contributed by uranium, the results from γ-measurement under this peak show a larger deviation. The NAA method is rapid and gives results which are independent of the equilibrium states of the sample. However, a thorium ore which matrix is similar to those of samples to be analysed must be available as standard. This is to prevent the difference in the condentration of the neutron flux between the standard and the samples which might happen when the matrices are different.

The spectrophotometric and the titrimetric methods give excellent reproducibility. The procedures are, however, tedious. The chemical yeilds of the methods must be previously checked so that the absolute thorium contents can be evaluated.

The results of the uranium contents as obtained from radiometric methods are not satisfactory. The differences between the results of one single sample might be caused by two reasons. The uranium family in the samples is not in RE and the ratio of the ThO_2 : U_3O_8 contents is much too high. Since the NAA method for the determination of the uranium content is independent of the equilibrium condition of the sample, this method should be investigated and the results obtained from this method should be compared with those obtained from radiometric methods for further studies.