

CHAPTER V



CONCLUSIONS

Fairly complete digestion was obtained by allowing ~~minus~~ 200 mesh monazite to react with 96.5 per cent sulphuric acid at 210°C for 2 hours, the acid-to-sand weight ratio was 3 to 1. The digestion of monazite at 140°C in 40 per cent sodium hydroxide with an alkaline-to-sand weight ratio of 2 to 1 for a period of 4 hours gave a 80 per cent digestion yield. The acid process gives a higher yield and is more rapid. However, it carries along the phosphate ion and introduces the sulphate ion, both of which have a detrimental effect upon the subsequent thorium purification step. Using sodium hydroxide rather than sulphuric acid eliminates sulphate and phosphate ions from the resulting solution, greatly simplifying the preparation of the feed solution for the later thorium concentrate purification step. The excess caustic soda and a trisodium phosphate as by-product can be recovered.

Thorium was purified by solvent extraction using 40 volume per cent TBP in kerosene as extractant. High purity thorium (90 per cent) was obtained after 4 extraction and 4 scrubbing stages. An overall thorium yield of 100 per cent could be obtained from the acid processing of monazite whereas a 60 per cent yield was obtained from the alkaline processing.