INTRODUCTION

such sources are not economically workable; however, due to weathering and natural concentration, the mineral is accumulated in beach sand deposits which are most economic to process. The content of individual rare earth elements (mostly the light cerium sub-group La to Eu) in monazite and bastnaesite reflects quantitatively the relative abundance of rare earth's in nature. The proportion of the heavier or yttrium sub-group of rare earth's in bastnaesite is considerably less than that in monazite and which is itself less than that anticipated from crustal abundance data. In xenotime, yttrium and some of the less abundant (HREE) are present in larger proportions. While the minerals bastnaesite and monazite are abundantly available in nature in almost equal proportions, xenotime occurrence or availability is very small in comparison. Hence, the presence of a small proportion of heavy rare earth elements in xenotime does not have much importance in overall rare earth availability. Large differences, therefore are inherent in the availability of different rare earth elements.

Since monazite is chemically processed after its breakdown for REE recovery, both thorium and uranium should be recovered at least as by-products. Beside removal of these elements as radioactive contaminants from the REE products, their recovery would increase the added value in addition to their importance in the field of nuclear energy. In Egypt, monazite is indeed distributed in the form of beach placers along the Mediterranean coast from Abu-Quir in the west to Rafah in the extreme east with particular local concentrations of high grade deposits near Rosetta and Damietta.

2- Aim and Plan of the Work

The present thesis is thus formulated for the recovery of both thorium and uranium with high purity during processing of Rosetta monazite sand concentrate. To realize this objective, a number of topics have actually been studied:

- Optimization of IC parameters for the analysis of U, Th and REE.
- Breakdown or opening of the study monazite with sulfuric acid in comparison with that using the alkali caustic soda method.
- U/(Th + REE) direct separation via neutralization with NH_4OH.
- Recovery of the separated U by ion exchange.
- Recovery of U, Th (and REE) from the original sulfuric acid leach liquor by solvent extraction technique using dodecylamine.