AIN SHAMS UNIVERSITY
FACULTY OF EDUCATION
DEPARTMENT OF PHYSICS

Study of the specific radioactivity for volcanic and rock samples using different nuclear techniques

THESIS
SUBMITTED IN PARTIAL FULFILLMENT OF
DOCTOR OF PHILOSOPHY DEGREE
IN TEACHER PREPARATION IN SCIENCE
(Nuclear Physics)
TO
PHYSICS DEPARTMENT
FACULTY OF WDUCATION
AIN SHAMS UNIVERSITY
By

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2016

Ain Shams University
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ACKNOWLEDGMENT

I wish to express my sincere thanks to the almighty God for seeing me through another level of my education.

Also i would like to take this opportunity to express my gratitude to those people giving me help throughout my whole study period.

My deepest thanks and gratitude to **Prof.Dr/ Mahmoud Yassin** the head of Physics, Faculty of Education, Ain Shams University.

My deepest thanks and gratitude to **Prof.Dr/ Ashry Hasan Ashry**, Professor of Nuclear Physics, Faculty of Education, Ain Shams University, for his continuous supervision, providing the necessary facilities and valuable encouragement during the course of this work.

My gratitude and deep thanks to **Prof. Dr H. M. EL-Samman**, Professor of Nuclear Physics, Faculty of Science, Menofia University, for his effort, and fruitful help, continuous supervision, guidance and valuable encouragement during the course of this work, and who gave me some of his valuable time and advice during my work in the radon laboratory..

My utmost gratitude and deep thanks to **Prof. Dr W. M. Arafa**, Professor of Nuclear Physics, Faculty of Women, Ain Shams University, for suggesting the problem and for her kind supervision, fruitful discussions, stimulating suggestions and for her advice through out this work and strong interest in my work, as well as to provide the tools for the study of films and a microscope.

My deepest thanks and gratitude to. **Dr/ Mohamed Ahmed Abou-leila**, Associate Professor of nuclear Physics, Faculty of Education, Ain Shams University, for his everlasting encouragement, continuous supervision, fruitful advice which can never be forgotten.

DEDICATION

For all the love and well wishes, am indebted to you greatly. This work is dedicated to the spirit my father.

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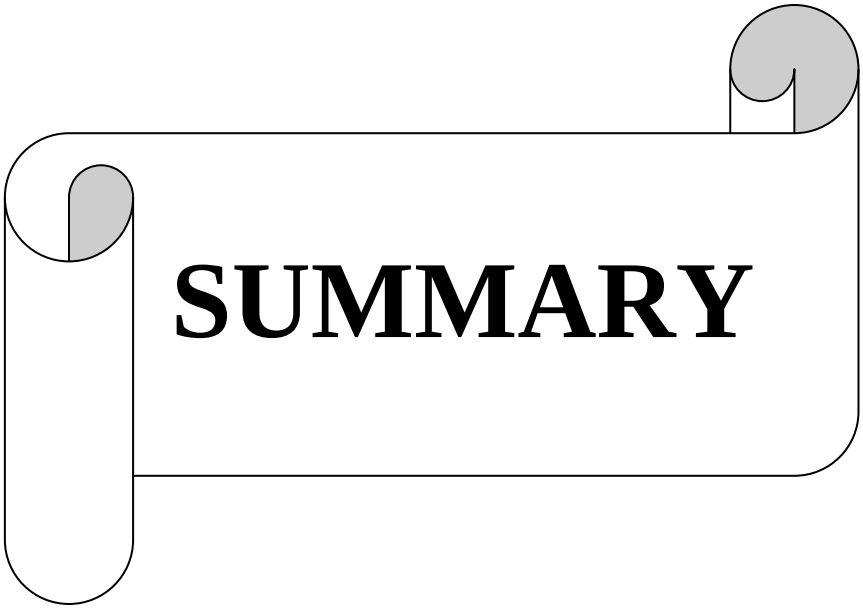
SUMMARY

Summary

This work aims to measure the natural radioactivity levels, radon exhalation rate and mass exhalation rate in volcanic and rock samples in some Yemen areas.

In the present study the radioactivity levels of the collected samples using high purity Germanium detector spectrometers has been determined. The measurement of radon concentration, radon exhalation rate and mass exhalation rate of radon (^{222}Rn) have been done using the cup-technique making use nuclear track detectors (CR-39).

In order to achieve this aim, the thesis is composed of four chapters:

Chapter one:

It consists of an introduction, natural and artifical sources of radiation, terrestrial radiation, gamma-ray interactions in matter and theoretical aspects.

Chapter two:

It contains a historical review of the work.

Chapter three:

This chapter contains a detailed identification of the areas under investigation, samples collection, samples preparation and the different techniques used in the present measurements. The activity concentration of ^{238}U, ^{232}Th, and ^{40}K are also measured using active

techniques. Finally, radon exhalation rates are also determined using cup-technique

Chapter four:

This chapter contains the results obtained throughout the present work. The activity concentration of terrestrial radionuclides ^{238}U, ^{232}Th and ^{40}K have been determined using high purity Germanium detector spectrometers.Fvaluation of radiological hazard as well as radon concentration, radon exhalation rate and mass exhalation rate of ^{222}Rn have been obtained using cup technique. The obtained values were compared to the international values