USING CR-39 SOLID STATE NUCLEAR TRACK DETECTOR (SSNTD) FOR LONG TERM MONITORING OF INDOOR AND OUTDOOR RADON GAS AT KUALA TERENGGANU

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Final Year Project Report Submitted in
Partial Fulfillment of the Requirement for the
Degree of Bachelor of Science (Hons.) Chemistry
in the Faculty of Applied Sciences
Universiti Teknologi MARA

NOVEMBER 2009

ACKNOWLEDGEMENT

In the name of Allah, The Most Gracious and Most Merciful, thanks to Him for his Kindness for giving me the ability and strength to complete this project paper.

Upon completion of this project, I would like to express my gratitude to many parties. My heartfelt thanks goes to my supervisor, Assoc. Prof. Dr. Hj. Zaini bin Hj. Hamzah and also my co-supervisor, Prof. Madya Dr. Ahmad bin Saat for their advices, kindness and helps me most to finish this project.

An undertaking of this kind of work cannot come to fruition without the help and encouragement of many people in Kuala Terengganu. I wish to thank all dwellers whom gave me cooperation while I was doing my research at their place which was chosen as my study locations.

I wish to pour with lots of love and gratitude to my parents for their support and encouragement, so that I managed to complete this project paper. I also indebted to all laboratory assistants for providing me places to run the samples and the information that I need.

Last but not least, I wish to thank all of my friends for their valuable and creative suggestion and close cooperation during the preparation of this project.

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ABSTRACT

USING CR-39 SOLID STATE NUCLEAR TRACK DETECTOR (SSNTD) FOR LONG TERM MONITORING OF INDOOR & OUTDOOR RADON GAS AT KUALA TERENGGANU

Radon is a radioactive gas that comes from the radioactive decay of uranium, which is present in small amounts almost everywhere in the Earth's crust. If radon is inhaled, it can cause harm to cells in the lungs and elsewhere. This can increased risk of cancer. Due to this, Kuala Terengganu was selected as the study area. Objectives of this study are to determine the level of radon activity concentrations in selected houses in Kuala Terengganu, Terengganu using SSNTD technique, to calibrate CR-39 SSNTD radon track detection efficiency, to compare the activity concentration with the global range value and to evaluate the possible risk that may cause by radon in the area. Technique that use for this study is SSNTD dosimeter which are the cheapest long-term monitoring device for alpha radiation from radon gas and radon daughters. Two dosimeters were located for indoor and outdoor at each selected study area. 24 houses were selected for this study. The dosimeters were collected after 105 days and brought to the laboratory. In the laboratory, SSNTD will chemically etch for 6 hours using NaOH, 6 M solutions at 70^{o}C in the oil bath. Detectors will then washed with tap water, distilled water and drained prior to microscope inspection. From the result, the radon concentration for indoor and outdoor and annual effective dose was calculated. The radon mean concentration for indoor and outdoor is 1.18 pCi/L and a 0.28 pCi/L and the dose level ranged for our study is between 0.59 mSv/y and 1.83 mSv/y.

CHAPTER 1

INTRODUCTION

1.1 General background

Radon is a naturally occurring radioactive gas. It comes from the radioactive decay of uranium which is present in small amounts almost everywhere in the Earth's crust. When a radioactive atom decays, its nucleus which is unstable would break down and turning into the nucleus of another element called a daughter product. At the same time, a small burst of radiation is released in the form of an alpha particle or a beta particle or one or more gamma rays. Uranium breaks down through a series of radioactive daughter products, which usually remain chemically attached to the material containing the uranium, until radon is formed. Radon being chemically inert does not combine with the atoms of its host material, instead it works its way through the tiny cracks and voids in the ground and into the atmosphere, where it can be inhaled in the air we breathe (ARPANSA, 2007).

1.2 How radon gas enter into houses

Figure 1 shows how uranium can generate radon gas by fission. The radon gas will itself undergo further fission to produce radioactive 'daughters'. The alpha particles produced by radon daughters are not powerful enough to penetrate the human body