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A Comparative Study for Indoor Radon Measurements between CR-39 and Kodak LR115-II Detectors

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Abstract

Because of an increasing interest of radon monitoring in dwelling environments, we investigate radon gas concentrations in dwelling of selected regions of Basrah Governorate. In the comparative study between LR115-II and CR-39, measurable radon concentrations and relative efficiencies were used in this investigation. The CR-39 detector was used in cup technique, while the LR115 detector is used as a bare mode. It is found that LR115 detector is more efficiency than CR-39 in the detection of alpha particle decay of radon, thoron gases and their progenies. The average indoor radon gas concentration in the target area was found to be 94.2 Bq/m^3 measured by LR115 and 18.61 Bq/m^3 measured by CR-39. Further, the values of concentrations measured by the two detectors were correlated very well.

Keywords; Indoor radon gas, Basrah Governorate, LR115-II, CR-39, Correlation

1. Introduction

Radon is a naturally-occurring radioactive gas. It is colorless, smelliness, or tasty. It is produced from the radioactive decay of radium, and it is found in soils just about everywhere, and continually escapes from soils into the atmosphere [1]. Although some radon can be virtually found in every house, under certain situations it builds up to high concentrations in indoor air, thereby constituting an important health hazard [2]. There are several different kinds or isotopes of radon, but the one that is of the greatest interest and concern regarding possible health hazard is called Radon-222. ^{222}Rn is produced during a chain of radioactive disintegration reactions that begin when uranium-238 starts to break down. The

uranium-238 is widely distributed in rocks and soils throughout the earth's crust.

The Environmental Protection Agency (EPA) recommends 4 pCi/L (148 Bq/m^3) as an "action level" for radon concentration inside buildings. This action level is based partially on the statistical studies of cancer incidence in underground mines, on laboratory animal experiments, and partially on laboratory measurements. It is generally possible to reduce indoor concentrations to 4 pCi/L or below according to ALARA principal [3]. A person with lungs that are highly sensitive to lung damage from radon decay products might be at a greater risk in a house with 4 pCi/L , or less, of radon than a very healthy individual living in a home with 10 pCi/L .