

Record 17 of 26**Title:** Measurements of thorium content and radioactivity in gas mantles**Author(s):** Aksoy, A; AlJarallah, M; AbuJarad, F**Source:** ARABIAN JOURNAL FOR SCIENCE AND ENGINEERING 22 (1A):25-35 Art No. ISSN 0377-9211 1997**Times Cited:** 5

Abstract: Natural gamma rays from the thorium (Th-232) isotope and its daughters in various imported gas lantern mantles were measured at the KFUPM gamma-ray spectroscopy setup. The origin of the natural gamma rays was qualitatively determined by a well shielded Hyper Pure Germanium (HPGe) detector, and then the concentration of the radioactive element was quantitatively measured using a 5"x5" NaI(Tl) detector and a PC-based data acquisition and analysis system. The mantle samples, of a few grams each, were studied for thorium concentration and its gamma ray radioactivity. In order to determine the absolute concentrations, the sample activity was compared with the activities of standards. The concentration of Th was determined in weight percent (wt.%) and ranged from 3.6 to 9.2% while the activity per mantle ranged from 7 to 25 nCi. Thorium distribution measurement in the mantle was carried out using CR-39 nuclear track detectors. The external gamma rays dose equivalent rate from one mantle sample was measured as 4 μ Sv/h when the mantle was placed on the detector surface. The calculated committed dose equivalent for ingestion of 10% of each of the lowest and the highest concentration of thorium mantles was found to be 0.5 mSv and 1.8 mSv respectively.