ـ ﺍﻟـﻠـﺴـﻠـﺘـﻲ ﺍﻟـﺍـﺕـﺯـﺎـﻥ ﺒـﺎـﻥ ﺍﻟـﺘـﻘـﻨـﺔ ﻓـﻲ ﻣـﻡ ﻋـﺤـﺴـﺎـﺏ ﻭ ﺍﻟـﺴـﻠـﺴـﻠﺔ ﻓـﻲ ﻓـﻲ ﻟـﻠـﻜـﻟـﻱ ﺍﻟـﺎـﻗـﺘـﺼـﺎـﺩـﻴـﺔ

(Al, Bi, Pb & Th) ﻃـﺎﺒـﻴـﻌـﺔ ﻋـﻠـﻰ ﻋـﻠـﻰ ﺍﻟـﻠـﻤـﺜـﺍﺭـﻨـﻴـﺓ ﺍﻟـﺘـﺭـﻜـﻴـﺯـﺍـﺕ ﻓـﻲ ـﺤـﺩ ﻓـﻲ ﻋـﻨـﺎـﺼـﺭـﺍﺕ ﻭ ﺍﻟـﻨـﻔـﺱ ﻛـﻤـﺎ ﻛـﻤـﺎ ﻓـﻲ ﻋـﻤـﻠـﻴـﺔ ﻓـﺎﺀ ﺍﻟـﺠـﺭـﻤـﺎﺀ ﻋـﻠـﻰ ﺍﻟـﻤـﻤـﺎﺭـﺩﺍﺕ ﻭ ﺍﻟـﺸـﻌـﺎﺀـﻴـﺔ 

(232 - ذ 238 - ﻃـﺎﺒـﻴـﻌـﺔ ﻋـﻠـﻰ ﻋـﻠـﻰ ﺍﻟـﻠـﻤـﺜـﺍﺭـﻨـﻴـﺓ ﺍﻟـﺘﺭـﻜـﻴـﺯـﺍـﺕ ﻓـﻲ ـﺤـﺩ ﻓـﻲ ﻋـﻨـﺎـﺼـﺭـﺍﺕ ﻭ ﺍﻟـﻨـﻔـﺱ ﻛـﻤـﺎ ﻛـﻤـﺎ ﻓـﻲ ﻋـﻤـﻠـﻴـﺔ ﻓـﺎﺀ ﺍﻟـﺠـﺭـﻤـﺎﺀ ﻋـﻠـﻰ 

ـ ﺍﻟـﻠـﺴـﻠـﺘـﻲ ﺍﻟـﺍـﺕـﺯـﺎـﻥ ﺒـﺎـﻥ ﺍﻟـﺘـﻘـﻨـﺔ ﻓـﻲ ﻣـﻡ ﻋـﺤـﺴـﺎـﺏ ﻭ ﺍﻟـﺴـﻠـﺴـﻠﺔ ﻓـﻲ ﻓـﻲ ﻟـﻠـﻜـﻟـﻱ ﺍﻟـﺎـﻗـﺘـﺼـﺎـﺩـﻴـﺔ

(Al, Bi, Pb & Th) ﻃـﺎﺒـﻴـﻌـﺔ ﻋـﻠـﻰ ﻋـﻠـﻰ ﺍﻟـﻠـﻤـﺜـﺍﺭـﻨـﻴـﺓ ﺍﻟـﺘﺭـﻜـﻴـﺯـﺍـﺕ ﻓـﻲ ـﺤـﺩ ﻓـﻲ ﻋـﻨـﺎـﺼـﺭـﺍﺕ ﻭ ﺍﻟـﻨـﻔـﺱ ﻛـﻤـﺎ ﻛـﻤـﺎ ﻓـﻲ ﻋـﻤـﻠـﻴـﺔ ﻓـﺎﺀ ﺍﻟـﺠـﺭـﻤـﺎﺀ ﻋـﻠـﻰ 

(232 - ذ 238 - ﻃـﺎﺒـﻴـﻌـﺔ ﻋـﻠـﻰ ﻋـﻠـﻰ ﺍﻟـﻠـﻤـﺜـﺍﺭـﻨـﻴـﺓ ﺍﻟـﺘﺭـﻜـﻴـﺯـﺍـﺕ ﻓـﻲ ـﺤـﺩ ﻓـﻲ ﻋـﻨـﺎـﺼـﺭـﺍﺕ ﻭ ﺍﻟ~
Study of the Equilibrium in the Naturally Occurring Radioactive Series in some Ores

Mai Salem Yeslam Ibrahim

Abstract

Uranium and thorium are important nuclear elements for the future of the production of nuclear energy. So the determination of their concentrations in different ores, rocks and sedimentations, to find the minerals in which they have high concentrations is a very important aim. The difference in chemical and physical properties of the different elements in the radioactive series, also weathering causes emigration of some nuclides, followed by disequilibrium between the elements in the natural radioactive series.

So the study of uranium and thorium series disequilibrium in the radioactive series, to measure the concentration of uranium and thorium also to find the minerals of commercial income for their production, helps in geological studies of the different rocks and sedimentation.

This thesis consists of four chapters:

Chapter 1: General introduction: it consists of an introduction, literature survey and the aim of the work.

Chapter 2: Some theoretical aspects: it consists of the disequilibrium theory and factors cause disequilibrium, interaction of radiation with the detector crystal, types of photon detectors and their properties, definition of resolution and efficiency, the electronic circuit in the gamma spectrometer, sources of background in the gamma spectrum, precision and accuracy and sources of error, as well as detection limit (DL).

Chapter 3: Experimental techniques: it consists of sample preparation and sites of sampling, description of the HPGe gamma spectrometer and the elements of the electronic circuit, a brief description of the atomic absorption spectrometer and the XR-D spectrometer, the calibration to energy and efficiency of the HPGe gamma spectrometer, also the concentration determinations of the different radionuclides and the measurement
of DL for each nuclide or radioactive series for the 640cc & 250cc volumes.

Chapter 4: Results and discussions: it consists of the minerals and chemical composition of each type of ore sample obtained from XR-D spectrometer. Concentrations of Al, Bi, Pb & Th measured by the atomic absorption spectrometer. Concentrations of radionuclides in the U - 238 – Ra – 226 & Th – 232 series as well as K – 40 measured by HP Ge spectrometer. The results were presented for each type of ore separately and followed by the discussion of equilibrium in radioactive series, a comparison of the present results with previous published results.

Finally the causes of disequilibrium in the radioactive series.