



شبكة المعلومات الجامعية

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ





شبكة المعلومات الجامعية



شبكة المعلومات الجامعية

التوثيق الالكتروني والميكرو فيلم

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بلله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون أية تغيرات



يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %



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بعض الوثائق الأصلية تالفة



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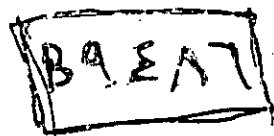


بالرسالة صفحات

لم ترد بالأصل



AIN SHAMS UNIVERSITY
FACULTY OF SCIENCE



**Geochemistry of Uranium and Thorium Isotopes
in their Ores and associated Groundwater,
El Atshan, El Erediya and El Missikat
areas, central Eastern Desert, Egypt**

**A THESIS
PRESENTED BY**

**YEHIA HASSAN DAWOOD
(B. Sc. & M.Sc.)**

**FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY IN GEOLOGY**

**GEOLOGY DEPARTMENT
FACULTY OF SCIENCE
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CAIRO, 1998



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Approval Sheet

Ph. D. Thesis

(Geochemistry of uranium and thorium isotopes in their ores and associated groundwater, El Atshan, El Erediya and El Missikat areas, central Eastern Desert, Egypt.)

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ABSTRACT

Fourteen secondary uranium ore samples, forty rock samples and twelve groundwater samples were collected from El Atshan, El Erediya and El Missikat mining areas in the central Eastern Desert, Egypt. The mineralogy, geochemistry and U-Th isotopic composition were studied using different collaborative techniques.

Petrographical and mineralogical studies have been performed using optical microscope, X-ray diffraction technique and Scanning Electron Microscope equipped with Energy Dispersive X-ray analyzer.

Uraninite is identified in the radioactive silica veins of El Missikat mining area. Sulfide minerals: galena, pyrite, chalcopyrite, and sphalerite are found associated with uraninite. The most common secondary uranium minerals identified are soddyite, kasolite, and uranophane at El Atshan mine and uranophane and kasolite at El Erediya and El Missikat mining areas. These secondary uranium minerals are found at the surfaces of tabular fractured rock bodies, which host primary uranium mineralization at depth. At El Atshan the host rock is a bostonite sill cutting siltstones, and at El Erediya and El Missikat the host rocks are silica veins cutting granitic pluton in several shear zones. The occurrence of these secondary uranium minerals as idiomorphic crystals indicates episodic rather than continuous growth.

Radiochemical method was used to separate uranium and thorium isotopes from other elements. These isotopes were measured by Alpha Spectrometry. At El Atshan and El Erediya, whereas the primary mineralization is pre-Tertiary, the secondary mineralization at both sites is dated using U-series methods at 80,000 to 140,000 years. At both sites adsorbed uranium in the host rock immediately below the secondary ores is shown to have been emplaced at 10,000 to 60,000 years. These episodes of uranium mobilization seem to have resulted from groundwater saturation during humid oxygen isotope climatic

stages 5 and 1 to 3, respectively.

Concentrations of the major and trace elements, were measured in the surficial groundwater and associated country rocks in the central Eastern Desert of Egypt using ICP-ES , AAS and Spectrophotometric techniques. Sr, Mn, V, U, Zn, and Pb are relatively enriched in the granitic groundwaters whereas K, Ti, Mg, Ca, Fe, and Na show more affinity to the country rocks. Uranium appears to be acting conservatively, as evidenced by its strong correlation with chloride, sodium and sulfate. A clear relationship is demonstrated between the concentrations of some major and trace elements in the granitic groundwaters and the corresponding elements in the country rocks. The uranium in the rock occurs mostly as a leachable component, which was mobilized and readsorbed 75,000 to 100,000 years ago according to U-series isotopic dating. The plot of $^{234}\text{U}/^{238}\text{U}$ vs. $1/^{238}\text{U}$ in the groundwater suggests the probability that the dissolved uranium has been leached from the host granitic rocks in recent times. Taken together these chemical and isotopic data suggest that dissolution and weathering of granitic rocks are primary factors contribute to the chemical signature of the groundwater.

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