بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون آية 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 %

شبكة المعلومات الجامعية

بعض الـوثـــائق

الأصـليـة تـالـفـــة

صفحات بالرسالة

لم ترد بالأصـــل

ORE MICROSCOPY, GEOCHEMISTRY OF HOST ROCKS AND CONCENTRATION PATTERNS OF GOLD AND ASSOCIATED ELEMENTS, MARAHIQ GOLD MINE, SOUTHERN EASTERN DESERT, EGYPT.

A THESIS

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by

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1999

Dedication

I dedicate this work to the sprit of my brother and to my parents, my brothers, my sisters, my wife and to my son Islam.

Ore-microscopy, geochemistry of host rocks and concentration patterns of gold and associated elements, Marahiq gold mine, Southern Eastern Desert, Egypt.

Abstract

Wadi Marahiq area lies in the Southern Eastern Desert of Egypt, between latitudes 22° 26' and 22° 35' N and longitudes 33° 23' and 33° 31' E, 237 km south-east of Aswan town. It is geologically mapped on scale 1: 40,000.

Geological, petrographical and geochemical studies were carried out to identify and classify the different rock units, occupying the studied area. Ore-microscopy and geochemistry of gold-mineralization at Marahiq gold mine, were studied to understand the genesis of god-mineralization and investigate the distribution patterns of gold and associated elements as well as to delineate the metallogenetic model for this gold-mineralization.

Marahiq area is occupied by four main Precambrian basement rock units, arranged from oldest to youngest as the serpentinites and related talc carbonates, the metavolcanics, the metavolcanosedimentary rocks and the quartz-diorites. These rock units were invaded by a large number of quartz veins and dykes. The studied area is crossed by two shear zones, trending (NW-SE). The serpentinites and related talc-carbonate rocks occur in the eastern part of Marahiq area, along a shear zone . The metavolcanic rocks are the abundant voluminous rock unit, covering major parts and forming moderate to high hills and elongate masses, either as massive or sheared masses. The metavolcanosedimentary rocks are

dominantly lying in the southern part of Marahiq area, whereas, the quartz-diorites are of limited distribution and occur mainly in the north-eastern part.

The serpentinites are composed of antigorite and lizardite with subordinate amount of chlorite, talc, carbonates and opaque minerals. The metavolcanics are represented by meta-basalts, meta-andesites, meta-dacite porphyries and their meta-pyroclastics. The metavolcanosedimentary rocks are represented by chlorite-talc schist and biotite-chlorite schist.

Ore-microscopic studies, using both the reflected-light microscope and the (SEM) scanning electron microscope, were carried out. Pyrite, cobaltite, chalcopyrite, covellite, magnetite, specularite, malachite, goethite and hematite are the main ore-minerals associating gold at Marahiq gold mine. Gold occurs as native and electrum. Two crystal varieties of pyrite and cobaltite occur (corroded fine-grained and idiomorphic coarse-grained crystals). The paragenetic sequence of formation of these ore-minerals was established by using the micro-textural and micro-structural relationships between them.

Depending on formation stages of sulfide minerals, two phases of mineralization were investigated. The first phase is characterized by formation of the fine-grained sulfides at high temperatures (>200°) and the second phase was formed due to progressive enrichment in sulfur and decrease in temperature. During this latter phase, coarse-grained sulfide minerals (pyrite and cobaltite) replaced the fine-grained sulfides. Gold was remobilized, leached and re-deposited as native and electrum during this second phase.

Geochemically, the metavolcanic and metavolcanosedimentary rocks hosting gold-mineralization, are calc-alkaline *to tholeiite in nature with low to medium-K. They were formed within island-arc tectonic setting.*

Gold shows high average contents within the mineralized quartz veins, alteration zones and host rocks. The highest concentrations of gold were observed within the wall-rock alteration zones and outer parts of mineralized quartz veins. The alteration zones are the most prospective parts. Gold shows significant correlation with Ag, Cu, Ni, Co, Pb, Zn and As, favouring that they are gold-associated elements forming the studied mineralization. These elements occur either as sulfide-minerals, detected microscopically, or corporated within crystal lattice of these sulfide minerals. The lateral zoning study reflects presence of lateral zonal distribution of elements within the different mineralized zones (quartz veins, alteration zones and host rocks).

Gold mineralization at Marahiq gold mine, was typically formed due to interaction between hydrothermal solutions and the host rocks. Marahiq gold mineralization is island-arc gold mineralization that remobilized and localized during the hydrothermal stage accompanied metamorphism and formation of youngest rock units in the area.

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