Minister of Scientific Research
City of Scientific Research and Technological Applications
SRTA-City

وزارة البحث العلمي
مدينة الأبحاث العلمية والتطبيقات التكنولوجية
نائب مدير المدينة للشئون العلمية والبحثية

Report on the Ph.D. thesis titled:

"Ecological and geochemical characteristics of the soils and sediments of the territory adjacent to the zinc ore enrichment plant of the Chaabet-El-Hamra mine (Algeria)"

Submitted by Ms. **Omara Rima** in partial fulfilment of the Ph.D. degree of Candidate in geological and mineralogical sciences (Scientific specialty 1.6.4. Mineralogy, Crystallography).

Ms. Omara Rima has presented valuable work on the environmental state of the territory adjacent to the mining and processing enterprise of Kherzet Youcef. 42 soil and sediment samples and seven vegetation samples are selected by the author of the thesis to evaluate the contamination by the heavy metals and to establish the patterns of transition of the main pollutants (Zn, Pb, and Cd) into the most bio-available mobile forms.

So, in this context, this work has focused on the environmental impact of the Kherzet Yousef mining complex that's localized in the region of Ain Azel (Setif city, Algeria). The zinc ore ions extraction and processing site belongs to the National Company for the Production of Non-Ferrous Mining Products and Useful Substances"(ENOF); it has been operating for more than 30 years. The activities of this complex pose a risk of contamination of the entire surrounding environment (surface and groundwater and also arable soils). Her manuscript was conducted in 157 pages, consisting of an introduction, six chapters, a conclusion, and citing 142 references. In this manuscript, she highlighted the soils' main problems and designed detailed protocols for their rehabilitation.

The results were well presented in **21** tables and **31** figures and discussed extensively. These results exhibit that the study area is characterized by loose surface deposits with a slightly alkaline or alkaline reaction with low organic matter; practically all studied samples contain carbonates (dolomite, calcite, in some samples smithsonite and cerussite), in many sample sulphides as well as gypsum. In addition, it has been established that the dumps in the near mining complex area of Kherzet Youssef contain a significant amount of sulphide minerals (pyrite, marcasite, sphalerite predominates at some points); therefore, desulfurization seems to be the optimal solution to improve the ecological situation in this territory by using the flotation technology.

The most important point in this work is the use of new data of the physicochemical modeling for calculating the mineral composition of soils and wastes during their interaction with natural waters.

In conclusion, Ms. **Omara Rima** is an excellent researcher; she has a good experience in her field of study and a high capability and competence to work as a doctor.

Based on the above, I recommend the following:

A- Continue with the further steps required to obtain the degree of candidate (Ph.D.) of geological and mineralogical sciences at Saint-Petersburg State University (Russian Federation), i.e., with the defense of her thesis,

B- Awarding **Omara Rima** the title of Doctor of Philosophy, she truly deserves it!

Prof. Dr. Mohamed Rashad Abdel Fattah,

M. Rashad 16.10.2022

Deputy Director for Scientific and Research Affairs
Professor of Environmental Soil Chemistry, Land and Water Technologies Department, Arid Lands Cultivation Research Institute, City of Scientific Research and Technological Applications, Alexandria, Egypt.
E-mail: marashad2@gmail.com; mrashad@srtacity.sci.eg
Tel:+2034593420; +2034593423; +201119659933

РК № 33-06-1086 от 21.10.2022