ENGLISH

Topic/Title

Fumarolic minerals of the recent activity of Somma-Vesuvius in the historical samples of the Royal Mineralogical Museum (University of Naples Federico II)

Proposer (Tutor)

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Research proposal

The project aims to investigate the mineralogical, petrographic and geochemical characteristics of the exhalative deposits of the historical activity of Somma-Vesuvius, preserved in the Vesuvian collection of the Royal Mineralogical Museum of Naples. These deposits represent unique testimonies of the fumarolic conditions and eruptive dynamics, providing valuable information on the chemical composition of the vapors/gases and on their formation temperature.

Due to the unavailability of most of the Vesuvian outcrops, today it is almost impossible to find this type of samples in situ. Therefore, most of them are preserved in the rich collections of the Museo Mineralogico of Naples. The Museum has a collection of more than four hundred historical samples of sublimates, never studied before.

The aim of the research is: (1) the definition of the mineralogical associations, often extremely rare and rich in metals of particular interest for metallic georesources (base metals, critical metals, etc.); (2) the reconstruction of the environmental conditions and genetic processes of the Vesuvian fumarolic associations; (3) the creation of a mineralogical database, associated with a correct museological cataloguing, in the context of an enhancement of the scientific-historical heritage of the Mineralogical Museum of Naples.

For this PhD proposal, the first step will be the macroscopic description and selection of the most significant samples of the collection of Vesuvian sublimates, cataloging them by typology, as well as possible provenance and dating of the associated eruptions (where possible). Together with a bibliographic research on the vast existing literature, a first database scheme will be produced as the scientific starting point for the subsequent analitycal work. The analytical phase will include combined mineralogical-petrographic methodologies (optical microscopy; X-ray diffraction on powders, XRPD, and single crystal, SC-XRD; electronic microscopy and microanalysis, SEM-EDS and WDS; infrared spectroscopy FTIR and Raman; thermal analyses TGA-DTA-DSC; high-resolution transmission microscopy with microanalysis and electron diffraction, TEM-HRTEM, AEM, SAED) and geochemical (XRF, ICP-MS), through which the mineralogical associations of the different products will be characterized. The results obtained will be integrated and interpreted within the framework of a minerogenetic model related to active volcanic areas, for which Somma-Vesuvius represents an excellent case study.

Research Plan

I° year

- Bibliographic research
- Sample selection
- Mineralogical, petrographic and geochemical analyses

II° year

- Data acquisition and processing
- Stay abroad at research institutes

- Preparation and submission of abstracts and articles
- Participation in conferences

III° year

- Article preparation
- Participation in congresses
- Drafting and submission of the PhD dissertation