

Type Minerals from the Island of Vulcano, Aeolian archipelago, Sicily, Italy

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The Aeolian archipelago consists of seven islands of volcanic origin, arranged along an arc 90 km long that extends westward with other submerged volcanoes. The Vulcano Island is the southernmost and the third largest of these islands.

The island of Vulcano has an age of about 120,000 years. The volcanic activity occurred with many explosive eruptions some of which accompanied by caldera collapse. The last one led to the formation of the Fossa Caldera (or Lentia) where is located the still active vent of the island, La Fossa volcano, active since 6000 years at least.

The most recent eruptions, originated from La Fossa crater, except Vulcanello (183 b.C. - XVI century) and the two craters of Forgia Vecchia, which formed in the VI century A.D. and in 1727. The last eruption began on August 3rd, 1888 with a succession of explosions and lasted until 22nd March 1890. After 1890, there have been several cycles of increasing and decreasing fumarolic activity, the last of which began in 1977, reaching its peak in the early 90's with temperatures around 700°C, lowered to 400° - 450°C today. In recent years, fumaroles are concentrated on the northern rim and inside the crater.

Scientific interest in the island began in the late XVIII century, so that it became a destination for many travelling scientists including Déodat Gratet de Dolomieu, Jean Houel, who left us a beautiful series of paintings of Aeolian landscapes, and Lazzaro Spallanzani, then Giuseppe Mercalli, Ottorino De Fiore, Ludovico Sicardi and, among mineralogists, Geherard vom Rath, Alfonso Cossa, Ugo Panichi, Alfred Lacroix, Ferruccio Zambonini, Guido Carobbi and Carlo Garavelli.

Currently the presence on the island of more than 100 mineral species is renowned. In addition, the Island of Vulcano is the "type locality" for 29 mineral species, 19 of which discovered in our studies. For the preliminary identification of mineralogical species a JEOL JSM 5500LV electron microscope (SEM), equipped with an EDS spectrometer has been used, For quantitative analysis a WDS JEOL8200 electron microprobe was used. Diffraction data were obtained using both a Philips PW1830 powder diffractometer and a Bruker APEX II single crystal diffractometer.

In 2011, the Associazione Micromineralogica Italiana published the book "Vulcano - Tre secoli di mineralogia", which describes all known species of this island [Campostrini et al. 2011]. The book is the result of a multi-year research project carried out thanks to a collaboration agreement between the Dipartimento di Chimica Strutturale e Stereochimica Inorganica (now Dipartimento di Chimica) of the University of Milan, and the Istituto Nazionale di Geofisica e Vulcanologia, sezione di Napoli | Osservatorio Vesuviano, aimed at the study of fumarolic minerals of Italian volcanoes.

Type Locality species on the island of Vulcano are the following.

- La Fossa crater: adranosite, adranosite-(Fe), aiolosite, argesite, barberiite, brontesite, cannizzarite, clinometaborite, cossaite, d'ansite-(Fe), demartinite, demicheleite-(Br), demicheleite-(Cl), demicheleite-(I), hephaistosite, hieratite, knasibfite, lafossaite, lucabindiite, mozgovaite, panichite, pyracmonite, steropesite, thermessaite, thermessaite-(NH₄), vurroite.

- Faraglioni: aluminocoquimbite, magnesioaubertite, millosevichite.

The studied minerals are essentially of fumarolic origin. Our research has focused on La Fossa crater rim and intracrater fumaroles, where temperatures range from 250°C to over 450°C, and the emitted gases are of magmatic origin, with SO₂, H₂S, HCl, HF forming sublimates at the vents. Other areas of research, not less interesting, were the Faraglioni of Levante and Vulcanello, where fumaroles have temperatures below 100°C and are rich in H₂S (indicating geothermal or hydrothermal origin), allowing the deposition of sulphur and hydrate sulphates as a result of chemical attack of the rock by H₂SO₄.

Reference

Campostrini, I., Demartin, F., Gramaccioli, C.M., Russo, M. (2011). Vulcano. Tre secoli di mineralogia. 344 pp. Associazione Micromineralogica Italiana Ed., Cremona. ISBN 978-88-905541-0-0.

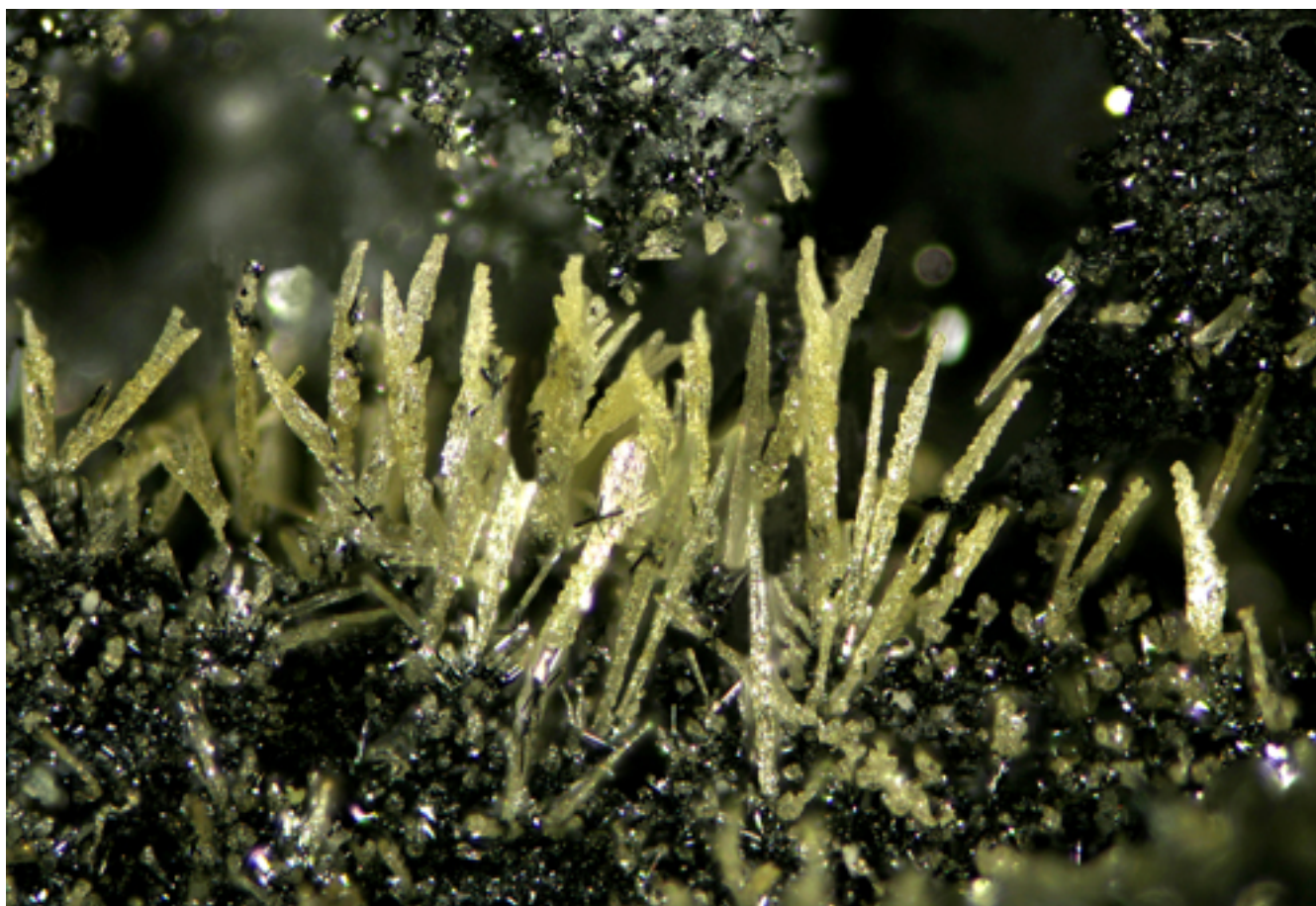


Fig. 1.1 - Hephaistosite, crystals of 3 mm, from La Fossa crater.