

Petrovite: Scientists discover a new mineral in Kamchatka

November 18 2020



Petrovit. Credit: SPbU

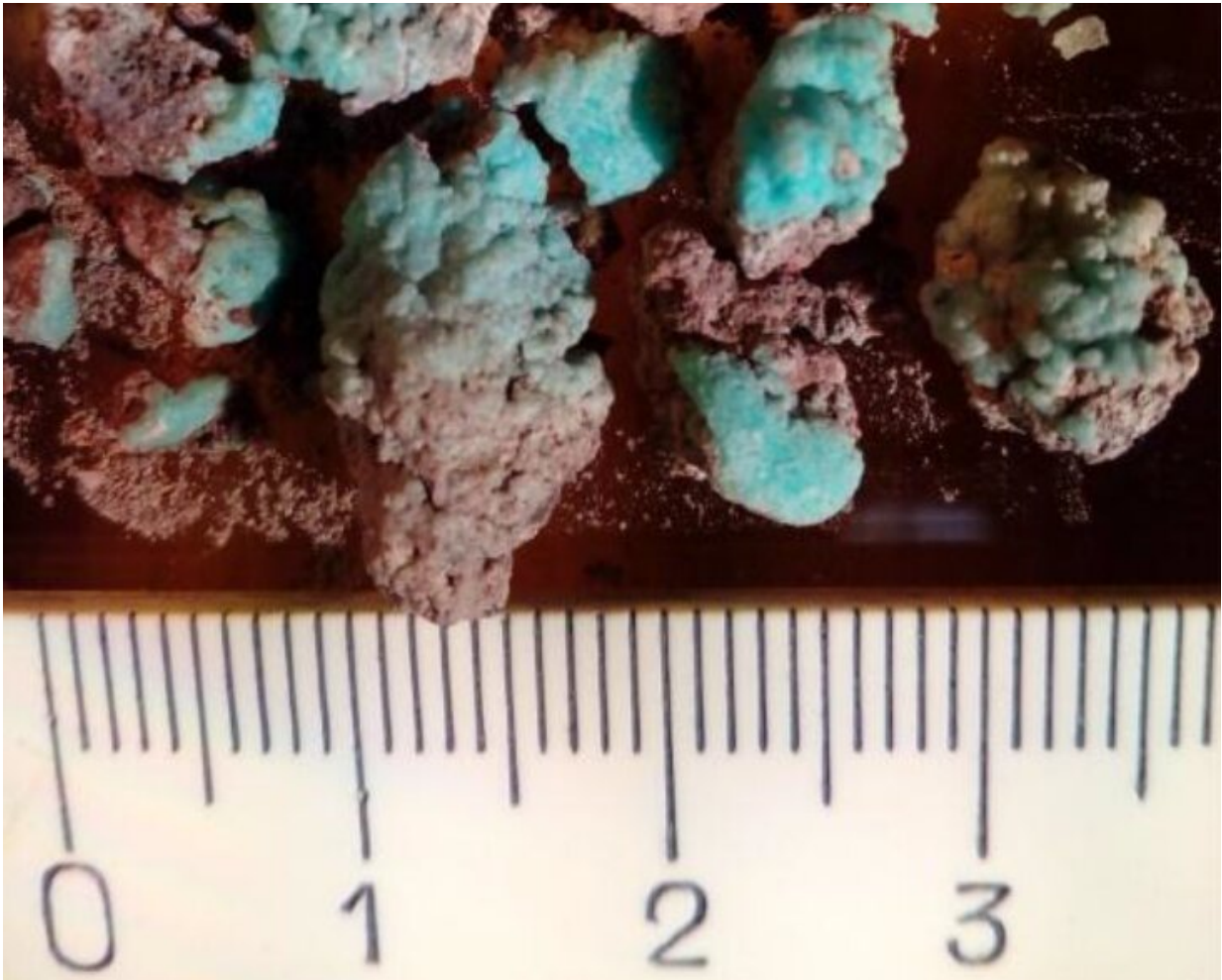
For more than 40 years, researchers have been studying the mineralogy of scoria cones and lava flows of fumaroles in Kamchatka. The features were formed after two major eruptions of Tolbachik Volcano—in

1975-1976 and 2012-2013. This territory is unique in its mineralogical diversity. In recent years, researchers have discovered dozens of new minerals here, many of which are one-of-a-kind in the world.

The recent find by the scientists from St Petersburg University, petrovite, $\text{Na}_{10}\text{CaCu}_2(\text{SO}_4)_8$, occurs as blue globular aggregates of tabular crystals with gaseous inclusions. "The [copper atom](#) in the crystal structure of petrovite has an unusual and very rare coordination of seven [oxygen atoms](#). Such coordination is characteristic of only a couple of compounds, as well as of saranchinaite, which was discovered by our colleagues from St Petersburg University—the research team of Professor Oleg Siidra," said the project manager, Professor Stanislav Filatov at St Petersburg University.

The mineral consists of oxygen [atoms](#), sodium sulfur and copper, which form a porous framework. The voids are connected to each other by channels through which relatively small sodium atoms can move. The scientists have therefore established that the structural type of petrovite is promising for ionic conductivity and can be used as a cathode material for sodium ion batteries.

"At present, the biggest problem for this use is the small amount of a transition metal—copper—in the crystal structure of the mineral. It might be solved by synthesizing a compound with the same structure as petrovite in the laboratory," said Filatov.



Petrovit. Credit: SPbU

More information: Stanislav K. Filatov et al, Petrovite, $\text{Na}_{10}\text{CaCu}_2(\text{SO}_4)_8$, a new fumarolic sulfate from the Great Tolbachik fissure eruption, Kamchatka Peninsula, Russia, *Mineralogical Magazine* (2020). [DOI: 10.1180/mgm.2020.53](https://doi.org/10.1180/mgm.2020.53)

Provided by St. Petersburg State University

Citation: Petrovite: Scientists discover a new mineral in Kamchatka (2020, November 18)
retrieved 25 April 2024 from <https://phys.org/news/2020-11-scientists-mineral-kamchatka.html>

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