



NEW MINERALS FROM ICELANDIC LAVA CAVES AND SELECTED SPELEOTHEMES

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Abstract

Many Icelandic caves exhibit abundant mineral encrustations but a lot of work is still to be done in that field. The Icelandic caves are prone to a large quantity of precipitation nearly all year round and thereby water-soluble minerals vanish very quickly after they have formed. In several caves special conditions prevail like for instance in Surtsey, due to the low age of the lava flow, many unstable water-soluble minerals are still present. During the second ISS expedition to Surtsey, samples resembling *mirabilite* were collected. The mineral has very loosely bound molecular water, which is readily lost, when samples are removed from the cave environment. Due to the confirmed presence of the anhydrous sodium sulphate *thenardite*, a suspicion arose about the possible presence of *mirabilite*. A sample was carefully packed in a container with moist paper towel to preserve the humidity of the cave environment. Upon arrival from Surtsey the sample was immediately analysed with the Icelandic Energy Authority's XRD equipment, with several hours intervals. The presence of *mirabilite* was confirmed. A rate of the transformation from *mirabilite* to *thenardite* was also quantified to some extent.

In the cave Arnahellir on the Reykjanes peninsula, bright-green coatings on stalagmites were noted several years ago. Samples were taken from the cave and analysed with XRD. The results were rather surprising as it turned out to be *volborthite*, a copper-vanadate normally found in different environment. Later the presence of both copper and vanadium in the mineral was clearly confirmed using the Icelandic Technological Institute's Scanning Electron Microscope's EDS.

Icelandic lava caves display a vast array of speleothemes which Icelandic speleologists have had difficulty putting in global perspective. The caves Arnahellir and Jörundur in South Iceland are the two best examples of caves with extensive decorations, mostly stalagmites and stalactites, made from segregational liquid. Several examples of odd and unusual speleothemes are presented.