

Alburnite, $\text{Ag}_8\text{GeTe}_2\text{S}_4$, a new mineral species from the Roşia Montana Au-Ag epithermal deposit, Apuseni Mountains, Romania

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ABSTRACT

Alburnite, ideally $\text{Ag}_8\text{GeTe}_2\text{S}_4$, was discovered in the Cărnicele vein from the Roşia Montana epithermal Au-Ag ore deposit, Apuseni Mountains, Romania. The new mineral is associated with tetrahedrite, galena, pyrite, sphalerite, chalcopyrite, and tellurides (hessite, altaite, and sylvanite). Associated gangue minerals are rhodochrosite, quartz, calcite, and rhodonite. Alburnite was observed only at the microscopic scale as rounded to sub-rounded grains, veinlets or irregular inclusions hosted mainly by tetrahedrite, hessite, and rhodochrosite. Due to the small size of alburnite grains observed so far it was not possible to determine some macroscopic properties; reported properties are based on microscopic observations. The mineral has a metallic luster and is opaque. It is non-fluorescent and has an estimated Mohs hardness of 4. The mineral shows no cleavage. Density could not be measured because of the small grain size, but calculated density based on the empirical formula is 7.828 g/cm^3 . In plane-polarized light in air, alburnite is gray-blue with a bluish tint. It shows no pleochroism or bireflectance in air. Between crossed polars alburnite is isotropic and internal reflections have not been observed in air. The mineral decomposes in intense light. Reflectance minimum values in air (in percents) are: 470 nm 29.70; 546 nm 28.00; 589 nm 27.35; 650 nm 26.95. The average chemical composition based on 18 electron microprobe analyses from 9 different grains in one polished section is (in wt%): Ag 65.49, Ge 4.82, Te 20.16, S 9.66, total 100.13. The ideal formula of alburnite, $\text{Ag}_8\text{GeTe}_2\text{S}_4$, based on 15 apfu requires Ag 65.43, Ge 5.50, Te 19.35, S 9.72, total 100.00 wt%. Features of the crystal structure of alburnite were determined based on electron backscattered diffraction and transmission electron microscopy. Alburnite is cubic, space group $F43m$, with unit-cell parameters $a = 10.4(1) \text{ \AA}$, $V = 1125(30) \text{ \AA}^3$, $Z = 4$. The strongest eight calculated XRD lines [d in $\text{Å}(hkl)$] are: 6.004(67)(111), 3.136(48)(113), 3.002(100)(222), 2.600(26)(004), 2.123(33)(224), 2.002(61)(115), 1.838(76)(044), and 1.644(12)(026). The name of the new mineral alburnite is derived from the Latin name of the locality. Roşia Montana Au-Ag deposit was known during the Roman period as *Alburnus Maior*. The mineral and the mineral name have been approved by the Commission on New Minerals, Nomenclature and Classification, IMA 2012-073.

Keywords: Alburnite, new mineral, germanium-tellurium sulfosalts, Roşia Montana, Apuseni Mountains, Romania