

## THE MICROSTRUCTURE OF SOME AGATES FROM APUSENI MOUNTAINS, ROMANIA

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The agates from Apuseni Mountains are found in cavities of strongly decomposed volcanic rocks (Mesozoic ophiolites or Neogene volcanics) as andesites, basalts, trachyandesites, vitrophiric rhyolitic spherulites, rhyolitic lentils or in Neogene sedimentary rocks but they may be found loose as pebbles in some streams. The main types of agates in the area may be summarised as follows: wall-layered type agates, agates with collomorphic structure, sagenitic agates, moss-agates and carnelian agates. Sometimes agates are often large, up to 15-30cm in diameter. They are characteristically coloured in startling shades of red, yellow-brown or bluish-grey. The bulk chemical analyses of agates show high values of SiO<sub>2</sub> (92.60 to 98.20%) and minor amounts of TiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub>, CaO, MgO, Na<sub>2</sub>O, K<sub>2</sub>O and S. The typical structure of agates observed under the polarising microscope is the petrographic fibrosity. Based upon the spherulite, the main structural types observed in the agates are the long fibres, rosette and block system from band textures. Between crossed polars, wall-lining chalcedony exhibits a rhythmic extinction banding normal to the direction of fiber elongation. The CL images of agates from Techereu show concentric bands with different luminescence. Chemical analyses obtained by SEM with EDS reveal higher contents of Al<sub>2</sub>O<sub>3</sub> for the bands with higher luminescence. Due to its compact microstructure, agate is exceptionally hard. The Brazilian test of an agate done with a simple motor-driven press, revealed a high value of 23.85 MPa for the tensile strength at failure which was caused by a force of 16.79 kN.