

Displaying the internal structures of Midas Monument remained via GPR and determination their petrographic and mineralogical properties via Confocal Raman Spectroscopy: Central Anatolia, Eskişehir, Turkey

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The ruins of Midas City prove that Phrygia had developed an advanced Bronze Age culture. Midas Monument remained a Phrygia civilization, lived between the 9th and 7th centuries BC in the Eskişehir region of Central Anatolia-Turkey. The Phrygian culture interacted in a number of ways with Greek culture in various periods of history. The Midas Monument has taken the shape of a giant rock-cut facade measuring over 16.5 meters in width and some 17 meters in height. The rock of the facade is nature rock heightened from surface. The ruins mainly composed of welded ignimbrite in compositions. There are a lot of rock cut chambers seems as a multi-storey apartment in the North of the monument. The GPR method is used to evaluate the existence of internal structures and display the micro fractures and cavities of Midas Monument to interpret the stability condition of the ruin. 800 MHz shielded antenna was used to acquire GPR data on parallel profiles on the monument and 250 MHz shielded antenna was used on parallel profiles spaced 1m apart to research stability conditions around the monument and rock cut grave chambers. All the data obtained 2D/3D image of the GPR with half bird's eye view visualization of depth slices and their transparent 3D sub-volumes and pictured fractures on the Midas Monument and buried cavities representing rock cut tombs between monuments and the rock cut necropolis. The ruins mainly composed of three type of ignimbrites: well welding, weakly welding and non-welding ignimbrites. The Confocal Raman spectroscopy of the ignimbrite reveal that they are composed of oligoclase, andesine, sanidine, biotite, quartz, augite, ilmenite and magnetite with different shape and sizes of volcanic glass. White coloured pumice fragments may form the main characteristic composition of this ignimbrite. The monument is represented by well welded of ignimbrite type in the ruins.

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