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At present, the study of an archaeological site without the associated radioisotope research methods is an anachronism. As many geoarchaeologists rightly point out, the cultural layer cannot be fully studied only by excavating and collecting artifacts; this requires the application of methods of natural sciences.

Electron paramagnetic resonance (EPR) analysis is one of the alternative methods on dating of ancient artifacts and based on the fact that natural ionizing irradiation produces paramagnetic centers in tooth enamel with the long mean life. Those centers are stable at the temperatures below 100 °C and might be considered as a measure of the total irradiation dose to which a particular sample has been exposed. In this work the EPR method has been applied to determine the age of animal tooth enamel found in Aghstafa archeological site in Azerbaijan. Method based on the fact that the intensity of the EPR signal increases linearly with the additional laboratory irradiation. The enamel was initially removed from teeth using a dental drill and water cooling. The 2 mm mean thickness enamel was then placed in a 30% NaOH solution for one day to disinfect it and separate any remaining dentine. A dental drill was used to strip around 50 ± 5 μm from inside and outside of the enamel surface to ensure that alpha radiation had no effect. In total 0.6 g enamel was collected and it was air-dried at room temperature for three days. ESR signal for the sample was measured with a Bruker EMXplus (X-band) spectrometer. Fig. 1 shows the dose dependence spectra for the enamel sample from the tooth found Aghstafa district of Azerbaijan. The archaeological dose obtained by the extrapolation back to zero ordinate was 9.73 ± 0.47 Gy. In order to estimate the natural dose rate soil samples were collected from the site and U, Th, and K content analysis by gamma spectrometry Canberra GR4520. ROSY program was employed to calculate the age of tooth enamel. The age of the tooth found in Aghstafa archeological site was estimated as 8432 ± 416 BP.

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