

# Synchrotron radiation-based methods for characterizing adobe materials found at SARYAZD cultural heritage



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## Abstract

At the 41<sup>st</sup> session of the UNESCO World Heritage Committee, held in Krakow, Poland, Yazd in central Iran was accorded world heritage status. The historical structure of Yazd is a collection of public-religious architecture comprising different islamic architectural elements of different ages in harmony with climatic conditions; in this region, the village of Saryazd has several fabulous historical monuments including the Saryazd Castle with its unique architecture. This castle is one of the world's largest adobe structures from the Sassanid era (from 224 to 651 CE). The Saryazd Castle is located in Mehriz's Saryazd village. It was a government-owned defensive structure built around 1,400 years ago and is constructed of clay and mud Saryazd Castle has been one of the **oldest and largest bank safe deposit boxes** in Iran and the world.

The primary objective of this study is to use synchrotron radiation-based techniques for X-ray fluorescence spectrometry (XRF), X-ray absorption spectroscopy (XAS), X-ray powder diffraction (XRPD), and extended X-ray absorption fine structure (EXAFS) to characterize adobe materials discovered at the SARYAZD cultural heritage site. The analysis provides high-resolution information and a deeper understanding of the elemental and (crystal) phase composition, molecular structure and elemental analysis, tomography, morphology, and, in particular, the porosity of materials dating back 1400 years.



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