Villa de Noheda (Cuenca, Spain): a multi-analytical approach for mortar characterization

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The Roman architectural ensemble of Noheda, known by the fantastic dimensions of the tile panels have been classified as Cultural Heritage in 2012 and open to the public since 2015. Located at 500m of the homonymous village in Spain, corresponds to a roman *Villa*, dated from 4t^{h} to 5th century, which evidences an agricultural use trough a constructive complex with several functions.

Until now there are two exhumed areas of the rural complex: some structures belonging to the *pars rustica* and on the other hand, a sector of the *pars urbana*, composed of some balneary outbuildings and various rooms of the residential building. It is in this last one that stands out the so-called Triabsid Room, not only for its imposing dimensions of 290.64m^2, and its extraordinary pavements, but also for its complex architectural articulation and its careful walls decoration composed by marble plaques and mural painting.

Under the framework of a bilateral Iberian project, several mortar samples were analysed for their compositional and textural characterization. The studied mortars cover a wide spectrum of architecture contexts (*triclinium* and its access areas, octagonal room and baths), inside and outside walls, and also later added walls. The data acquisition techniques consisted of X-ray diffraction (XRD), thermogravimetric analysis (TGA), scanning electron microscopy coupled to energy dispersive X-ray spectrometry (SEM-EDS) and thin-section optical microscopy.

The mortars are mainly composed by quartz aggregates, with semi-angular to semi-rounded grains, and very small amounts of K-feldspars. A generalized feature is the presence of numerous lime nodules, sometimes of centimeter-size, with calcitic composition. Lithic, ceramic and coal were occasionally observed. According to XRD analyses, the raw materials are very similar between samples suggesting a similar provenance, probably a river sand. The binder is an aerial calcite lime that was used mainly with a binder:aggregate ratio of 1:2 as determined by TG-DTA. The mortar from the baths have a smaller amount of binder (1:4) as well as an external wall (1:3) interpreted as a late enlargement after abandonment of the *Villa*.

The results obtained point out to a considerable similarity not only at the level of the raw materials but also in the production technique used in the different areas of the residential building of the *pars urbana*, which would not have been altered in subsequent interventions. Differences were found only for the different functionalities; whether in the baths or when dealing with external walls.