

Characterization of decorative Portuguese gypsum plasters from the 19th and 20th centuries: the case of the Bolsa Palace in Oporto

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Abstract

The use of gypsum plaster for the interior coating of walls and ceilings in the Portuguese architecture was particularly expressive in the period between the XVIII and the XX century. However, information about this important heritage is almost nonexistent, which is leading to a rapid loss of important patrimony. In this paper the results of the characterisation of five gypsum plaster samples from the second half of the XIX century belonging to the *Arabian Room* of the *Bolsa Palace*, located in Oporto, North of Portugal, are presented and discussed. XRD and TGA-DTA techniques were used to establish the mineralogical composition, and the relative proportions of the binders. Optical microscopy and FESEM-EDS observations were performed both in fractured and polished surfaces in order to determine the stratigraphy and the composition of individual layers. The results of this characterisation work showed that the plasters used were mainly composed of gypsum and hydrated lime in different proportions – a feature that was correlated with the application techniques of the decorative elements analyzed - and allowed the determining of the restoration interventions they had already been submitted to. Some physical properties like the dynamic modulus of elasticity and capillary absorption were also determined, and a correlation between the results obtained was established with previous studies performed by the authors.

Keywords: gypsum plasters, characterisation, XRD, TGA-DTA, Microscopy, Modulus of elasticity, Capillary absorption