

Mineralogical characterization of rendering mortars from decorative details of a baroque building in Koźuchów (SW Poland)

Abstract

Optical microscopic observations, scanning electron microscopy and microprobe with energy dispersive X-ray analysis, X-ray diffraction and differential thermal/thermogravimetric analysis allowed detailed characterization of rendering mortars from decorative details (figures of Saints) of a baroque building in Koźuchów (Lubuskie Voivodship, Western Poland). Two separate coats of rendering mortars have been distinguished, differing in composition of their filler. The under coat mortar has filler composed of coarse-grained siliceous sand, whereas the finishing one has much finer grained filler, dominated by a mixture of charcoal and Fe-smelting slag, with minor amounts of quartz grains. Both mortars have air-hardening binder composed of gypsum and micritic calcite, exhibiting microcrystalline structure.

Introduction

Mortars employed in ancient constructions comprise various binding materials of aerial or hydraulic nature, natural or artificial aggregates, as well as numerous additives, passive or latent hydraulic – which react with binding material [1]. Lime was continuously used in building work as basic binding material, before cement was discovered [2], whereas mixed gypsum lime was employed less frequently. Whatever the composition of the binder, historic masonry commonly exhibits deterioration, first of all caused by natural and anthropogenic weathering. The restoration of historic masonry requires knowledge enabling to reproduce materials with physico-chemical and mechanical proprieties similar to the original ones. The use of recent cement-based or polymer-based repair materials may induce damages to original historic masonry [3], [4],