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Environmental Degradation of Granite Stoneworks, Karnak Temples, Egypt

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Abstract : Karnak temples complex is one of the most important archaeological sites in the world. A huge portion of this complex was constructed of granite such as; the colossal statues of Ramses II, Thutmose III, parts of some pylons, and the obelisks. The granite stoneworks at Karnak complex suffer from different deterioration phenomena such as; missing parts, disintegration, exfoliation, contour scaling, cracks and fractures, in addition to different kinds of coatings (crusts, skin, soiling, film or thin layer) such as; dust, dirt, staining and crystallized salts, which lead to aesthetic disfigurement and chemical alterations. Deterioration factors were from different sources such as; changes in temperature, moisture, salts and wind in addition to anthropogenic factors. Studying deterioration factors and their phenomena was performed through different scientific investigations and analyses such as; light optical microscope (LOM), polarizing microscope (PM), scanning electron microscope (SEM), X-ray powder diffraction (XRD), Energy dispersive analysis (EDX). The obtained results have revealed that, the granite stoneworks suffer from crystallization of sodium chloride and calcium sulfate (gypsum) salts in addition to kaolinization and sericitization process.

Keywords : Karnak temples, granite, stoneworks, degradation, coating, salts, gypsum, kaolinite.

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