LA FACCIATA DI SANTA PUDENZIANA: Studio diagnostico per la caratterizzazione dei fenomeni di degrado, smaltimento delle acque e sperimentazione di consolidanti e protettivi nanometrici.

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Abstract
The facade of the paleochristian basilica of S. Pudenziana, in Rome, is a very interesting case study for the conservation of outdoor artificial and natural stone. In spite of the recent realization (1870), due to the wheatering, decohesion, disintegration and lacks occur on plasters, wall painting and the sand-stone portions (pietra serena). For the recent conservation project, in order to test new nanomaterials for consolidation and protection, a preliminary diagnostic study of the water interactions with the original materials was necessary. The aim of the study was developing a conservative strategy to limit the degradation mechanisms related to water and improving the conservation status of the facade. An experimentation of nanometric products already tested in the European project Nano-Cathedral was also conducted, to assess their compatibility with natural and artificial stone materials exposed to the action of water. Thermo-hygrometric monitoring, related to the detection of the surface temperature of some critical point, provided significant data on temperature and humidity excursions and evaporation and condensation cycles. Water infiltrations, water retention areas and rising damp were highlighted by the thermographic acquisition of the facade and related to the investigation of the water content of the masonry. The problem of water disposal of the elements in the first order was also considered. After investigations, the experimentation of ethyl and nanotitanium silicate-based consolidants and of silane and nanotitanium based protectives, carried out in situ and in the laboratory, confirmed their effectiveness and compatibility in situations where there is an important presence of water.