

The nano-photocatalysis for the conservation of the historical buildings

Charles Arthur Cassidy

Outdoor cultural heritage is highly vulnerable to atmospheric pollutants such as NO_x. This study investigates doped nanoceria as a visible-light-active and potentially more sustainable alternative to conventional TiO₂ photocatalysts in gypsum- and lime-based coatings. Five commercial photocatalysts (TiO₂, TiO₂-Kronos, CeO₂, Y-doped CeO₂, and Gd-doped CeO₂) were evaluated through colorimetry, UV-Vis DRS, ATR-FTIR, μ -Raman, and FE-SEM-EDS analyses. Photocatalytic NO_x removal was tested under controlled irradiation. Doped ceria samples were successfully activated under simulated solar light and showed a slower, more gradual photocatalytic response, with overall activity comparable to doped titania. These results suggest that doped nanoceria could represent a promising and potentially more durable solution for sustainable anti-pollution coatings in cultural heritage conservation.