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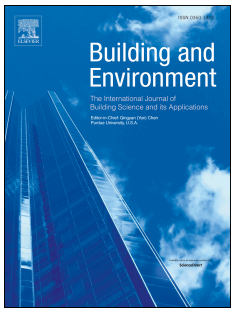

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PII: S0360-1323(18)30530-4

DOI: 10.1016/j.buildenv.2018.08.056

Reference: BAE 5669

To appear in: *Building and Environment*

Received Date: 29 May 2018

Revised Date: 11 August 2018

Accepted Date: 27 August 2018

Please cite this article as: Guo M-Z, Chen J, Xia M, Wang T, Poon CS, Pathways of conversion of nitrogen oxides by nano TiO_2 incorporated in cement-based materials, *Building and Environment* (2018), doi: 10.1016/j.buildenv.2018.08.056.

Pathways of conversion of nitrogen oxides by nano TiO_2 incorporated in cement-based materials

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Abstract

The ability of photocatalytic cementitious materials to degrade nitrogen oxides (NO_x) has been widely used to evaluate their air-purifying function. However, attention has been predominantly placed on the changes in the NO_x concentration but the fate of the degradation products is seldom investigated. This study presents a preliminary laboratory investigation on the photocatalytic NO_x degradation of nano titanium dioxide (TiO_2) incorporated self-compacting glass mortar (SCGM). Focus was mainly placed on the generation and distribution of the degradation products, nitrite (NO_2^-) and nitrate (NO_3^-), during the NO_x removal process. The results showed that the photocatalytic SCGM induced an apparent decrease of NO together with a slight increase of NO_2 under UVA irradiation. Meanwhile, the amount of the generated NO_2^- and NO_3^- on the surface of the tested samples, in the suspended aerosols, and in the flowing air stream increased as the photocatalytic reaction progressed. The accumulation of NO_2^- and NO_3^- on the sample surface led to a slight deactivation