

Accepted Manuscript

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PII: S1385-8947(15)00914-6
DOI: <http://dx.doi.org/10.1016/j.cej.2015.06.074>
Reference: CEJ 13846

To appear in: *Chemical Engineering Journal*

Received Date: 2 April 2015
Revised Date: 15 June 2015
Accepted Date: 16 June 2015

Please cite this article as: E. González, A. Bonnefond, M. Barrado, A.M. Casado Barrasa, J.M. Asua, J.R. Leiza, Photoactive Self-cleaning Polymer Coatings by TiO₂ nanoparticle Pickering Miniemulsion Polymerization, *Chemical Engineering Journal* (2015), doi: <http://dx.doi.org/10.1016/j.cej.2015.06.074>

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Photoactive Self-cleaning Polymer Coatings by TiO₂ nanoparticle Pickering Miniemulsion Polymerization.

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ABSTRACT

Titanium dioxide Pickering stabilized methyl methacrylate/n-butyl acrylate (MMA/BA) copolymer latexes were synthesized by miniemulsion polymerization. The particle size of the hybrid latexes was controlled by the concentration of TiO₂ used as stabilizer; the larger the concentration the smaller the particle size. The hybrid latexes formed coherent films with honey comb structures, the opacity of the films increased with the amount of TiO₂. The photocatalytic activity of the hybrid films was assessed by coating concrete specimens and analyzing the capabilities to degrade Rhodamine B under UV-light exposure. The films showed excellent self-cleaning activity and it was found that the photocatalytic activity index was little affected by the concentration of TiO₂ and the roughness of the film. The kinetic of the photocatalytic reaction was controlled by the diffusion of the Rhodamine B from the inner of the film to the interface.

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