

Accepted Manuscript

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PII: S0927-7765(18)30482-X
DOI: <https://doi.org/10.1016/j.colsurfb.2018.07.035>
Reference: COLSUB 9491

To appear in: *Colloids and Surfaces B: Biointerfaces*

Received date: 1-3-2018
Revised date: 22-6-2018
Accepted date: 16-7-2018

Please cite this article as: Milošević I, Rtimi S, Jayaprakash A, van Driel B, Greenwood B, Aimable A, Senna M, Bowen P, Synthesis and characterization of fluorinated anatase nanoparticles and subsequent N-doping for efficient visible light activated photocatalysis, *Colloids and Surfaces B: Biointerfaces* (2018), <https://doi.org/10.1016/j.colsurfb.2018.07.035>

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Synthesis and characterization of fluorinated anatase nanoparticles and subsequent N-doping for efficient visible light activated photocatalysis.

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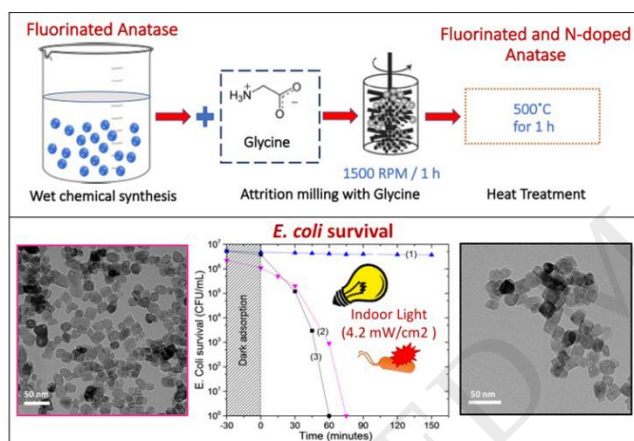
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Graphical abstract



Highlights

- Synthesis of fluorinated anatase nanoparticles obtained by precipitation from solution.
- Fluorinated and N co-doped anatase TiO_2 obtained by wet milling process.
- N-doping atoms mainly located in interstitial position.
- TiO_2 photocatalysts used for efficient the visible light bacterial inactivation.
- Significant degree of aggregation is the limiting factor in its photocatalytic activity.

Abstract

Fluorinated-titanium dioxide ($\text{TiO}_2\text{-F}$) nanoparticles in a pure anatase polymorph was precipitated from solution by hydrolysis of titanium oxychloride, using urea and ammonia as precipitation agents and potassium fluoride as a source of fluorine anion. A further wet attrition milling in presence of glycine completed by a heat treatment allowed an additional nitrogen doping of TiO_2 ($\text{TiO}_2\text{-F\&N-HT}$). The morphology and crystalline structure of the as-synthesized powder was determined by transmission electron microscopy (TEM) and X-ray diffraction (XRD) and showed that TiO_2 powder was composed of nanoparticles with narrow

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