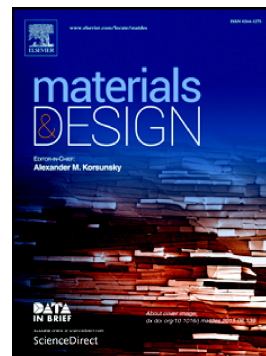


Accepted Manuscript

Plasmon enhanced visible light photocatalytic activity in polymer-derived TiN/Si-O-C-N nanocomposites

EranezhuthWasan Awini, Abhijeet Lale, K.C. Hari Kumar, Umit B. Demirci, Samuel Bernard, Ravi Kumar



PII: S0264-1275(18)30527-6
DOI: doi:[10.1016/j.matdes.2018.06.060](https://doi.org/10.1016/j.matdes.2018.06.060)
Reference: JMADE 4030
To appear in: *Materials & Design*
Received date: 26 March 2018
Revised date: 28 June 2018
Accepted date: 29 June 2018

Please cite this article as: EranezhuthWasan Awini, Abhijeet Lale, K.C. Hari Kumar, Umit B. Demirci, Samuel Bernard, Ravi Kumar, Plasmon enhanced visible light photocatalytic activity in polymer-derived TiN/Si-O-C-N nanocomposites. *Jmade* (2018), doi:[10.1016/j.matdes.2018.06.060](https://doi.org/10.1016/j.matdes.2018.06.060)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Plasmon enhanced visible light photocatalytic activity in polymer-derived TiN/Si-O-C-N nanocomposites

EranezhuthWasan Awin¹, Abhijeet Lale², K.C. Hari Kumar¹, Umit B Demirci³, Samuel Bernard², Ravi Kumar^{1*}

¹ Laboratory for High Performance Ceramics, Department of Metallurgical and Materials Engineering, Indian Institute of Technology-Madras (IIT Madras), Chennai 600036, India.

² Univ. Limoges, CNRS, IRCER, UMR 7315, F-87000, Limoges, France.

³ IEM (Institut Européen des Membranes), UMR 5635 (CNRS-ENSCM-UM), Université Montpellier, Place E. Bataillon, F- 34095, Montpellier, France.

Abstract:

Herein, we provide a detailed insight into the precursor chemistry, precursor-to-material transformation and characterization of nanocomposites made of a TiN nanophase and a Si-O-C-N ceramic. The polymer-derived ceramics (PDCs) route applied to synthesize these nanocomposites resulted in the formation of nanocrystals less than 4 nm in size and the calculated lattice parameter value for the nanocrystals ($a = 0.4239$ nm) matched the theoretical value of TiN ($a = 0.4241$ nm). The Si-O-C-N ceramic served as a platform for anchoring TiN nanocrystals. As a proof of concept, we have attempted to exploit the plasmonic properties of nanocomposites to achieve photocatalytic degradation of organic dyes. The absorption spectra clearly showed plasmonic resonance in the visible region with peak positioned around 670 nm according to the presence of TiN nanocrystals which resulted in the enhancement of dye degradation.

Keywords: Nanocomposites, Plasmonics, Photocatalysis, Dyedegradation.

*Corresponding author:

Email: nvrk@iitm.ac.in

Ph: +91-44-2257 4777 (office), Fax: +91-44-2257 4777

Download English Version:

<https://daneshyari.com/en/article/7216749>

Download Persian Version:

<https://daneshyari.com/article/7216749>

[Daneshyari.com](https://daneshyari.com)