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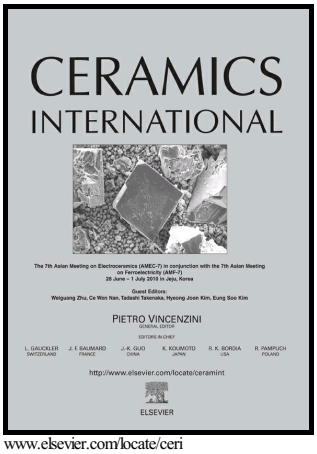

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PII: S0272-8842(16)32051-X
DOI: http://dx.doi.org/10.1016/j.ceramint.2016.11.063
Reference: CERI14151

To appear in: *Ceramics International*

Received date: 8 August 2016
Revised date: 14 October 2016
Accepted date: 8 November 2016

Cite this article as: Kele T.G. Carvalho, André E. Nogueira, Osmando F. Lopes, Gabriela Byzynski and Caue Ribeiro, Synthesis of g-C_3N_4/Nb_2O heterostructures and their application on removal of organic pollutants unde visible and ultraviolet irradiation, *Ceramics Internationa* http://dx.doi.org/10.1016/j.ceramint.2016.11.063

Synthesis of g-C_3N_4/Nb_2O_5 heterostructures and their application on removal of organic pollutants under visible and ultraviolet irradiation

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ABSTRACT

This paper describes the synthesis of a new series of g-C_3N_4/Nb_2O_5 heterostructures and their application on the removal of organic pollutants from water, as a combined strategy of photocatalysis and adsorption processes. The heterostructures were synthesized at different weight ratios through thermal oxidation and hydrothermal treatment, leading to an uniform assembly of Nb_2O_5 nanoparticles onto g-C_3N_4 surface. The heterostructures exhibited improved textural and electronic properties (narrowing in band gap) when compared to pure g-C_3N_4 and Nb_2O_5, respectively. Although adsorption capacities were shown to be influenced by Nb_2O_5 content, g-C_3N_4 was essential to increase the photocatalytic response of the g-C_3N_4/Nb_2O_5 heterostructures, which displayed an enhancement of photocatalytic performance on the degradation of methylene blue and rhodamine B dyes under visible and ultraviolet irradiation. The enhanced photoactivity was explained by the increase in the lifetime of the charge carries due to formation of heterojunctions between Nb_2O_5 and g-C_3N_4. A mechanistic investigation on the photocatalytic process was conducted by using different reactive