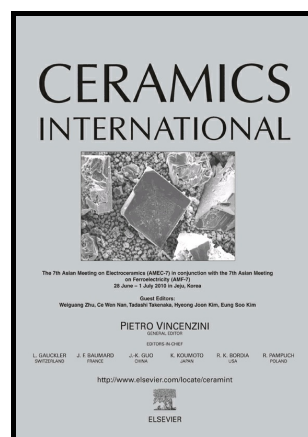


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**Synthesis of g-C<sub>3</sub>N<sub>4</sub>/Nb<sub>2</sub>O<sub>5</sub> heterostructures and their application on removal of organic pollutants under visible and ultraviolet irradiation**

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## ABSTRACT

This paper describes the synthesis of a new series of g-C<sub>3</sub>N<sub>4</sub>/Nb<sub>2</sub>O<sub>5</sub> 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<sub>2</sub>O<sub>5</sub> nanoparticles onto g-C<sub>3</sub>N<sub>4</sub> surface. The heterostructures exhibited improved textural and electronic properties (narrowing in band gap) when compared to pure g-C<sub>3</sub>N<sub>4</sub> and Nb<sub>2</sub>O<sub>5</sub>, respectively. Although adsorption capacities were shown to be influenced by Nb<sub>2</sub>O<sub>5</sub> content, g-C<sub>3</sub>N<sub>4</sub> was essential to increase the photocatalytic response of the g-C<sub>3</sub>N<sub>4</sub>/Nb<sub>2</sub>O<sub>5</sub> 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 carriers due to formation of heterojunctions between Nb<sub>2</sub>O<sub>5</sub> and g-C<sub>3</sub>N<sub>4</sub>. A mechanistic investigation on the photocatalytic process was conducted by using different reactive

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