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Enhanced Photodegradation of Bisphenol F Using g-C3N4:Nb2O5 Heterostructure: Synthesis, Characterization, and Potential Application

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The study investigated the photodegradation of Bisphenol F using a heterostructure of g-C3N4:Nb2O5. X-ray diffraction analysis revealed the crystallographic structure, showing the presence of pseudohexagonal phases of Nb2O5 and g-C3N4, indicating a successful synthesis of the heterostructure. BET analysis revealed an intermediate surface area for the heterostructure (44.64 m2/g), suggesting effective integration between the constituent materials and how their mass proportion impacts BET surface area values. Thermogravimetric analysis showed a gradual mass loss for the heterostructure, indicating enhanced thermal stability compared to pure g-C3N4. Morphological characterization by electron microscopy confirmed the formation of the heterostructure and revealed a uniform distribution of Nb2O5 nanoparticles on g-C3N4 sheets. This direct interaction between Nb2O5 nanoparticles and g-C3N4 sheets may promote effective transfer of photo-generated electrons, potentially enhancing the photocatalytic activity of the heterostructure [1]. These results highlight the potential of the g-C3N4:Nb2O5 heterostructure as an efficient photocatalyst for Bisphenol F degradation under UV light, achieving a C/C0 ratio of 0.98 after 60 minutes of photolysis, and a degradation rate of 0.85.

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[1]CARVALHO, Kele T.G.; NOGUEIRA, André E.; LOPES, Osmando F.; BYZYNSKI, Gabriela; RIBEIRO, Caue. Synthesis of g-C 3 N 4 /Nb 2 O 5 heterostructures and their application in the removal of organic pollutants under visible and ultraviolet irradiation. Ceramics International, [S.L.], v. 43, n. 4, p. 3521-3530, mar. 2017. Elsevier BV. http://dx.doi.org/10.1016/j.ceramint.2016.11.063.