Photocatalytic removal of toxic metal ions from water using functionalized g-C_3N_4

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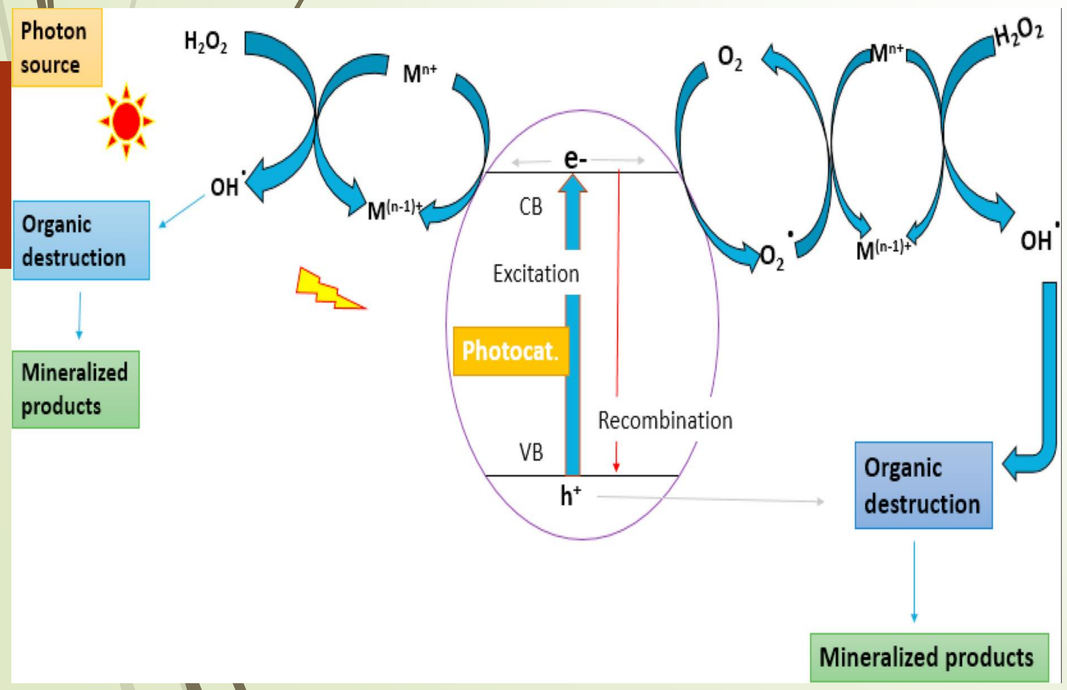
Introduction:

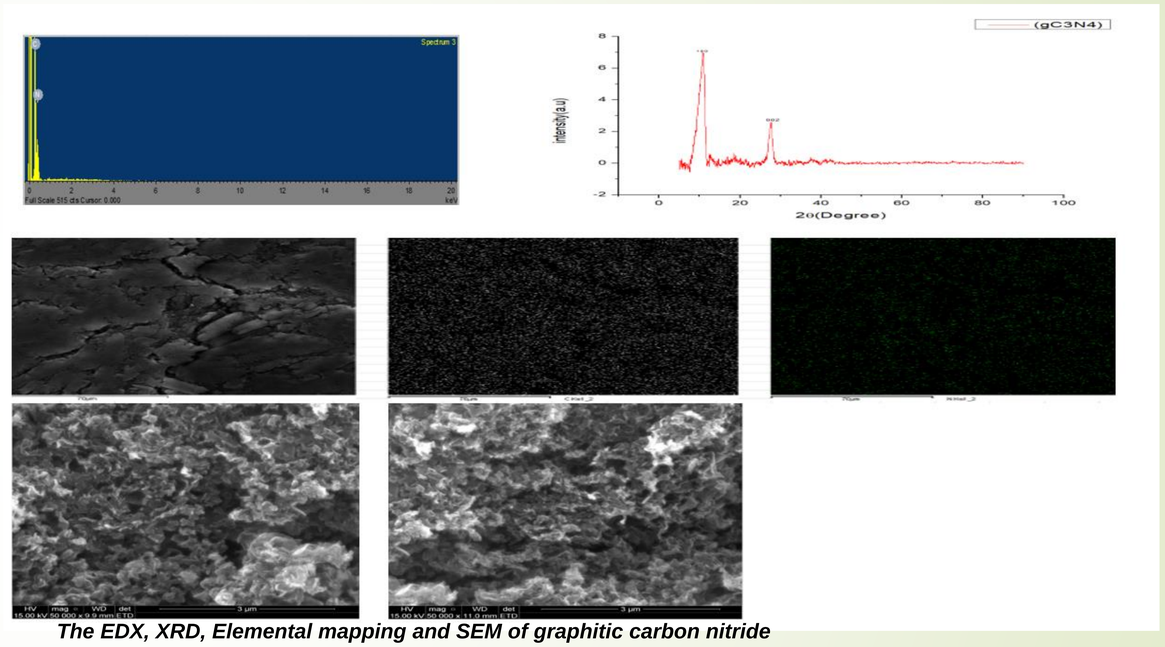
Environmental pollution is increasingly becoming a global concern, as toxic materials from the ever expanding industrial sector continue to find their way into the surface and ground water resources. Significant parts of this industrial effluents are toxic metals, which are found not only to endanger human's health but are also harmful to aquatic lives [1].Metals exist in ionic forms in solution, and the following oxidation states: As(V), Cd(II), Cr(VI), Pb(II) and Hg(II) have been reported to be very toxic among the metal ions present in the environment [2, 3]. Hence, their removal is necessary in order to achieve a green environment.

Methods:

Heterogeneous photocatalysis was used for the removal of the toxic metal ions while graphitic carbon nitride (g-C_3N_4), a polymeric semiconductor, functionalized with bismuth-based ternary nanoparticles was used as the photocatalyst. We obtained g-C_3N_4 by thermal condensation of melamine while the ternary nanoparticles were obtained by thermolysis of dithiocarbamate complexes.



Results:



The EDX, XRD, Elemental mapping and SEM of graphitic carbon nitride

Expected Outcome:

Complete remediation of the toxic metal ions from water using heterojunction systems synthesized from graphitic-C_3N_4 incorporated with ternary nanoparticles as photocatalyst.

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