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DECORATING TIO2 NANOTUBES WITH C3N4 FOR PHOTOCATALYTIC REMOVAL OF ORGANIC POLLUTANTS AND ANAEROBIC DIGESTION OF SLUDGE

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Herein, C_3N_4 and TiO_2 nanotubes (NTs) were considered for the synthesis of visible light active C_3N_4/TiO_2 NTs composites (with different melamine concentrations) by high temperature calcination method. The co-existence of C_3N_4 and TiO_2 NT and visible light activity was confirmed by XRD, TEM, UV-visible and PL spectroscopy. The photocatalytic performance of TiO_2 NT with 2% of melamine (precursor of C_3N_4), enhanced the degradation of 2-chlorophenol (k = 0.0176 min^{-1}), where 96.6 % removal was achieved at optimum pH 7.0 and pollutant load of 30 mg/L. The application of C_3N_4/TiO_2 NTs for solublization of rigid structure of sludge by photocatalysis released the soluble organics showing an improvement in sCOD production (4587 mg/L). Subsequently, anaerobic digestion of solubilized sludge has improved the methane production (723.4 $mlkg^{-1}$ VS) by 1.37 and 1.6 times compared to that in anaerobic digestion with photolytic and raw sludge, thus showing a promising applicability for biogas production from sludge.

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