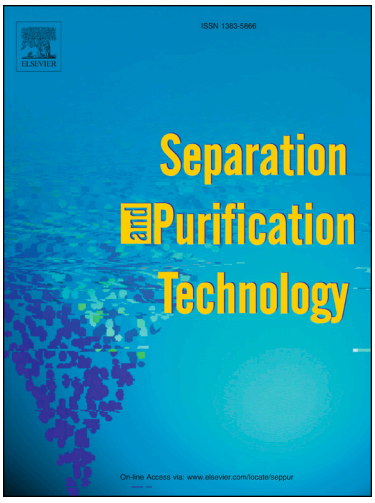

Utilization of $LaCoO_3$ as an efficient co-catalyst to boost the visible light photocatalytic performance of g-C_3N_4

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Abstract: Exploiting highly efficient noble metal-free co-catalysts with promoted photocatalytic performance of the photocatalysts is of great importance. Herein, binary $LaCoO_3$/g-C_3N_4 hybrids consisting of $LaCoO_3$ co-catalysts in-situ growth on the surface of g-C_3N_4 nanosheets were constructed *via* a facile mixed-calcination process and utilized for the photocatalytic degradation of methyl orange (MO) in aqueous solution at room temperature under visible light irradiation (λ>420 nm). As expected, all the $LaCoO_3$/g-C_3N_4 hybrids illustrated dramatically ameliorated photocatalytic efficiencies compared to the pristine g-C_3N_4. More importantly, the optimal photodegradation rate constant of $LaCoO_3$(3.0wt%)/g-C_3N_4 reached about 0.00348 min^{-1}, which was almost 3.2 times higher than that of pure g-C_3N_4 for MO degradation, which could be originate from the function of $LaCoO_3$ co-catalysts acted as excellent electron collectors for capturing the electrons generated by g-C_3N_4, effectively suppressed the photogenerated charge carriers recombination and prolonged the lifetime of the separated electron-hole pairs. Additionally, radical