Title:	Nanocrystalline Ag3PO4 for Sunlight- and Ambient Air-Driven Oxidation of Amines: High Photocatalytic Efficiency and a Facile Catalyst Regeneration Strategy
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Keywords:	Oxidation reactions Metal nanoparticles Amines Nanoparticles Catalysts
Issue Date:	2020
Publisher:	American Chemical Society
Citation:	ACS Applied Materials and Interfaces, 12(26), pp.29324-29334.
Abstract:	Selective oxidation of amines to imines using sunlight as clean and renewable energy source is an important but challenging chemical transformation because of high reactivity of the generated imines and lack of visible light-responsive materials with high conversion rates. In addition, oxygen gas has to be purged in the reaction mixture in order to increase the reaction efficiency which, in itself, is an energy-consuming process. Herein, we report, for the first time, the use of Ag3PO4 as an excellent photocatalyst for the oxidative coupling of benzyl amines induced by ambient air in the absence of any external source of molecular oxygen at room temperature. The conversion efficiency for the selective oxidation of benzyl amine was found to be greater than 95% with a selectivity of >99% after 40 min of light irradiation indicating an exceptionally high conversion efficiency with a rate constant of 0.002 min–1, a turnover frequency of 57 h–1, and a quantum yield of 19%, considering all of the absorbed photons. Ag3PO4, however, is known for its poor photostability owing to a positive conduction band position and a favorable reduction potential to metallic silver. Therefore, we further employed a simple catalyst regeneration strategy and showed that the catalyst can be recycled with negligible loss of activity and selectivity.
Description:	Only IISERM authors are available in the record.
URI:	https://pubs.acs.org/doi/10.1021/acsami.0c05961 (https://pubs.acs.org/doi/10.1021/acsami.0c05961) http://hdl.handle.net/123456789/3256 (http://hdl.handle.net/123456789/3256)
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