

Environmental Research, Technology Demonstration and Conference Project

ECF Project:	ECF 2021-43
Project Title:	Development of stable and cost-effective photocatalysts for the removal of nitrogen oxides in air
Principal Investigator:	Professor Zhang Ruiqin, Department of Physics, City University of Hong Kong
Total Approved Grant:	\$500,000
Duration:	1/7/2022 to 31/12/2023
Project Status/Remarks:	On-going
Project Scope:	<p>At present, the large amount of nitrogen dioxide (NO_x) released mainly from the burning of fossils is potentially threatening human health and deteriorating the urban living environment. To alleviate the excessive release of NO_x, the use of sunlight to convert NO_x on the surface of photocatalyst has attracted much attention from all over the world, which is expected to be an ideal green technology in future to reduce the concentration of NO_x in urban air. Recent years, the project team has developed a stable and cost-effective photocatalyst, i.e. carbon nitride (CN) film, and have successfully applied it in photoelectrochemical (PEC) cells for solar hydrogen production. The CN material not only has the advantages of metal-free, low cost, easy availability, and environmental friendliness, but also has a moderate band gap, effective carrier separation and migration, and good surface reactivity, thus presents a very broad application prospect. In this project, the project team will apply the CN-based material to the NO_x capture and redox by virtue of photoelectrocatalytic principle. The project team will optimize the CN-based materials' photocatalysis efficiency by tuning the material's C/N ratio and doping with foreign elements to promote industrialization of photocatalytic treatment systems towards a low NO_x concentration in air.</p>
Summary of the Findings/Outcomes:	To be available upon completion of the project