

## Photocatalytic Oxidation of Bicarbonate for Regeneration of Amine Absorbent

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Conventional CO<sub>2</sub> separation process with liquid absorbent needs heat energy of steam for regeneration of absorbent. For practical deployment of amine absorption process, researchers have focused on the reduction of the steam amount by using amine- or carbonate-based absorbents featuring a low heat of reaction, where these so-called 2nd generation absorbents are preferential to form bicarbonate. Nevertheless, they do not completely eliminate the necessity of the costly regeneration process. Herein, we report a new strategy for the regeneration of amine absorbent via photocatalytic oxidation using graphitic carbon nitride (g-CN) under visible light. Bicarbonate anion selectively scavenges the photoexcited holes on g-CN in the presence of a tertiary amine, leading to the decomposition of bicarbonate into CO<sub>2</sub> and the regeneration of amine absorbent. In the opposite site, photoexcited electrons can be utilized in the photoreduction, which generates solar fuels, i.e. hydrogen. As a result, the photocatalytic hydrogen evolution performance of g-CN can be improved. This approach implies the idea that combines solar energy conversion with the conventional industry.