

# Earth-Abundant Mixed-Metal Oxide@Carbon Nitride Photocatalysts for H<sub>2</sub>O<sub>2</sub> Generation Only From H<sub>2</sub>O and O<sub>2</sub>

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**Keywords:** H<sub>2</sub>O<sub>2</sub>, Photocatalyst, Carbon Nitride.

## 1. Introduction

Light-driven synthesis of H<sub>2</sub>O<sub>2</sub> only from water and molecular oxygen could be an alternative pathway for solar fuels production.<sup>1-4</sup> Herein, we designed a dual-functional photocatalyst i.e., mixed metal oxide/graphitic-C<sub>3</sub>N<sub>4</sub> (MMO@C<sub>3</sub>N<sub>4</sub>) for both water oxidation and oxygen reduction to generate H<sub>2</sub>O<sub>2</sub>.<sup>5</sup>

## 2. Results and discussion

The MMO@C<sub>3</sub>N<sub>4</sub> photocatalyst led to rapid generation of H<sub>2</sub>O<sub>2</sub>, with an initial rate that exceeded 4.0 μM min<sup>-1</sup> (in 30 min), which is superior to the controls (Figure 1). H<sub>2</sub>O<sub>2</sub> has the largest formation rate and lower decomposition rate on the MMO@C<sub>3</sub>N<sub>4</sub>. H<sub>2</sub>O<sub>2</sub> was produced only from water and dioxygen without any sacrificial organics (e.g. alcohols).

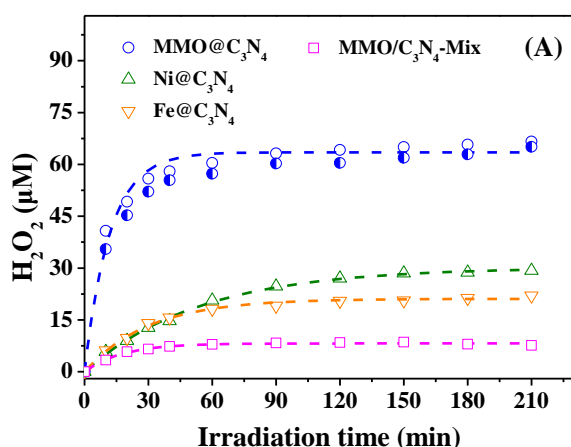


Figure 1. Light-driven H<sub>2</sub>O<sub>2</sub> generation over the photocatalysts

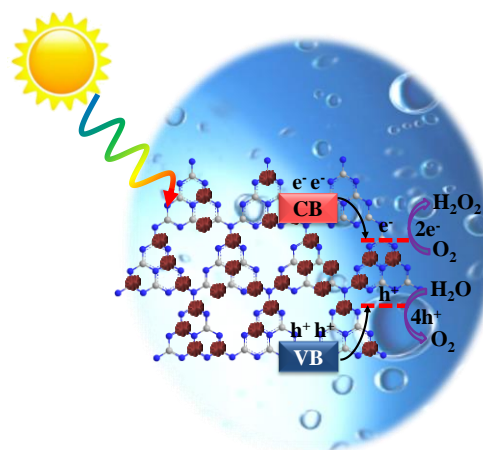


Figure 2. Scheme of energy levels and charge transfer

## 3. Conclusions

We developed a facile strategy to prepare an earth-abundant photocatalyst for H<sub>2</sub>O<sub>2</sub> synthesis. This work provides a promising way for clean production of H<sub>2</sub>O<sub>2</sub> owing to facile synthesis and extremely accessible feedstocks.

## References

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