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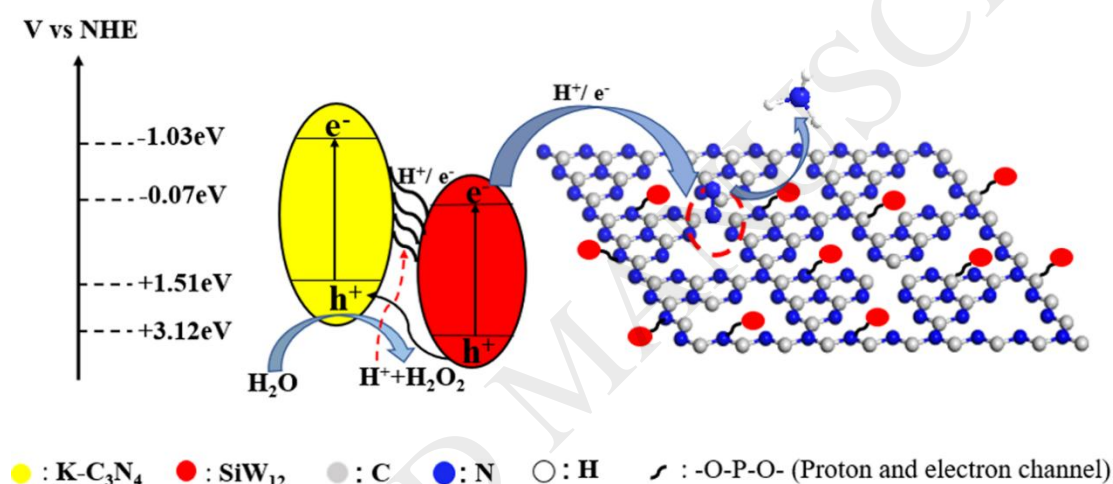
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# A new approach to enhance photocatalytic nitrogen fixation performance via phosphate-bridge: a case study of SiW<sub>12</sub>/K-C<sub>3</sub>N<sub>4</sub>

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## Graphical Abstract



## Highlights

- The formation of “phosphate-bridged” bonds between K-C<sub>3</sub>N<sub>4</sub> and SiW<sub>12</sub> enhanced separation efficiency of charge carriers.
- Bridged SiW<sub>12</sub> enhanced the performance of water oxidation.
- K doping and bridging SiW<sub>12</sub> improved the adsorption and activation of N<sub>2</sub>.
- The nitrogen fixation performance of SiW<sub>12</sub>/K-C<sub>3</sub>N<sub>4</sub> is relatively high.

**ABSTRACT:** Photocatalytic nitrogen fixation, as a low-cost and promising technology, needs efforts to explore the photocatalyst with high activity and stability. In this study, the polyoxometalate (POM) cluster of [H<sub>4</sub>SiO<sub>40</sub>W<sub>12</sub>] (SiW<sub>12</sub>) has been successfully covalently combined with the KOH-modified graphitic carbon nitride nanosheets (K-C<sub>3</sub>N<sub>4</sub>) through the phosphate-bridged strategy. With POM acting as the co-catalyst, SiW<sub>12</sub>/K-C<sub>3</sub>N<sub>4</sub> nanocomposites show excellent photocatalytic nitrogen fixation efficiency (353.2 μM g<sup>-1</sup> h<sup>-1</sup>)

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