Self-Sensitized Carbon Nitride Microspheres for Efficient Visible-Light-Driven Hydrogen Generation

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We present a new type of metal-free photocatalyst having a microsphere core of oxygen-containing carbon nitride and self-sensitized surfaces by covalently linked polymeric triazine dyes. These self-sensitized carbon nitride (SSCN) microspheres can be prepared through a simple solvothermal approach, and exhibit high visible-light activities in photocatalytic hydrogen generation with excellent stability for more than 100 hours reaction. Comparing to the traditional g-C_3N_4 with activities terminated at 450 nm, the polymeric triazine dyes on the carbon nitride microsphere surface allow for effective wide-range visible-light harvesting and extend the hydrogen generation activities up to 600 nm (Figure 1).[1] Further, the solvothermal approach allows for uniformly insertion of boron atoms into the polymeric carbon nitride framework, resulting in B-doped SSCN with reduced band-gap, enhanced charge separation efficiency and promoted surface reactivity for hydrogen generation.[2] This new type of highly stable self-sensitized metal-free structure opens a new direction of future development of low-cost photocatalysts for efficient and long-term solar hydrogen production.

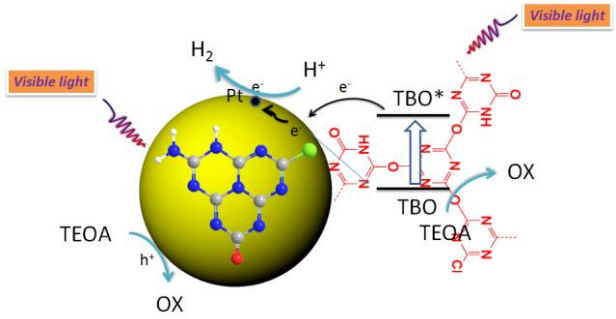

Figure 1. Schematic illustration of the self-sensitized carbon nitride microspheres for visible-light-driven hydrogen generation.

References: (Times New Roman 12)

[1] Q. Gu, Z. W. Gao, C. Xue, *Small* **2016**, 12, 3543

[2] Q. Gu, J. Liu, Z. W. Gao, C. Xue, Chem. Asian J. 2016, 11, 3169