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# Photodeposition of Pd Nanoparticles on ZnIn<sub>2</sub>S<sub>4</sub> for Efficient Alkylation of Amines and Ketones' $\alpha$ -H with Alcohols under Visible Light

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## Graphical Abstract



## Highlights

- Small sized Pd nanoparticles were deposited on the surface of ZnIn<sub>2</sub>S<sub>4</sub> via photo-reduction process.
- Pd-ZnIn<sub>2</sub>S<sub>4</sub> showed superior performance in light-induced alkylation of amines and ketones'  $\alpha$ -H with alcohols.
- A successful coupling of photocatalytic dehydrogenation of alcohols over ZnIn<sub>2</sub>S<sub>4</sub> with Pd-based hydrogenation
- Pd-ZnIn<sub>2</sub>S<sub>4</sub> exhibited high stability and reusability during the catalytic reaction.

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