

Merger of decatungstate photocatalysis and copper-catalyzed azide-alkyne cycloaddition reaction: an innovative approach for green synthesis of 1,2,3-triazoles

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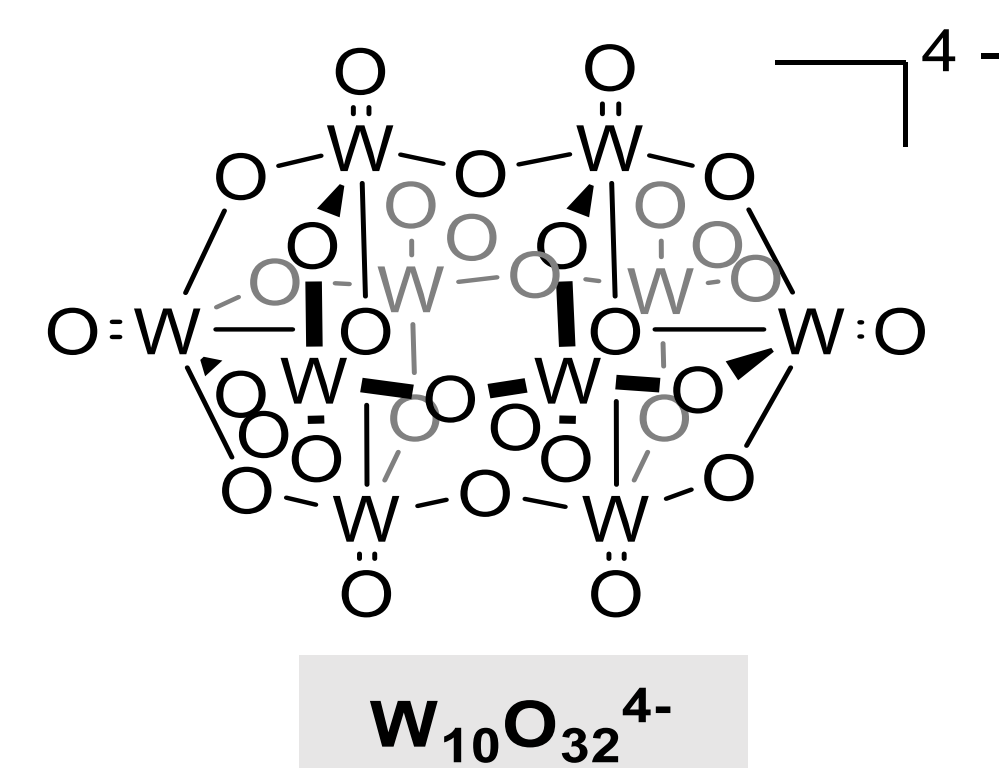
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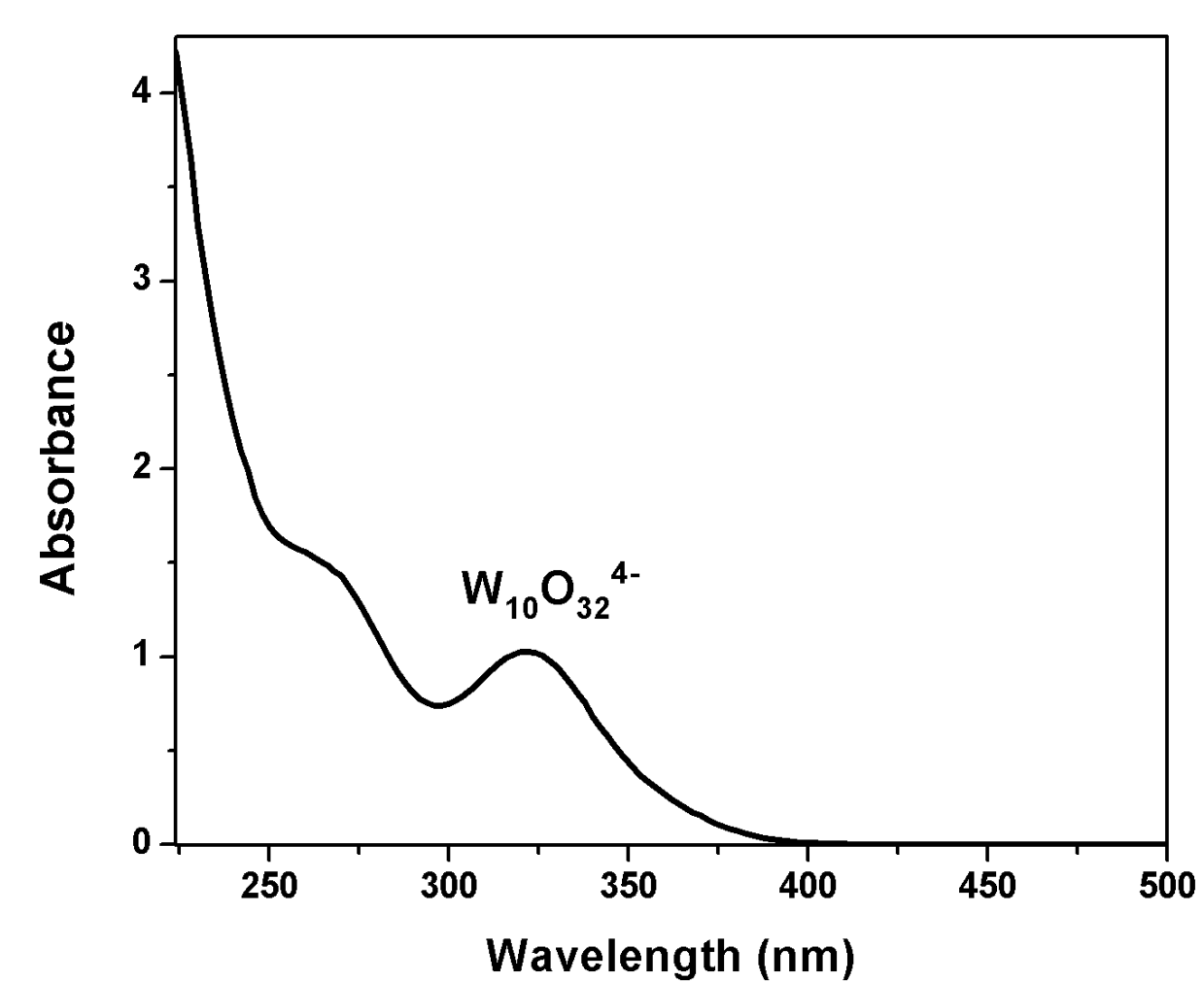
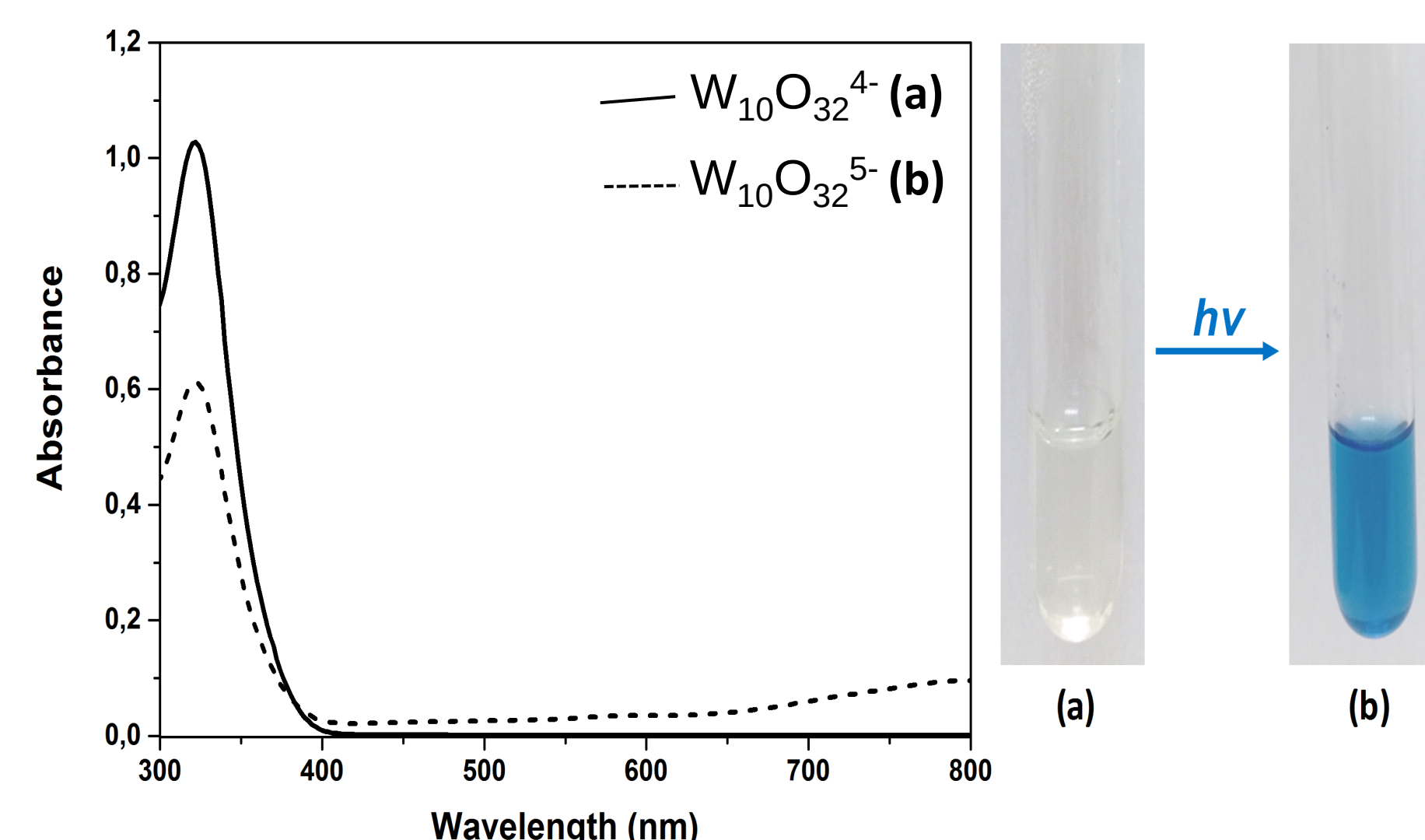
Main goal

This work outlines the merging of the photochemistry of Na₄W₁₀O₃₂ and CuAAC as a new and a simple strategy for carbon-nitrogen bond forming to regioselectivity construction of 1,4-disubstituted-1,2,3-triazole compounds by click chemistry reaction [1].

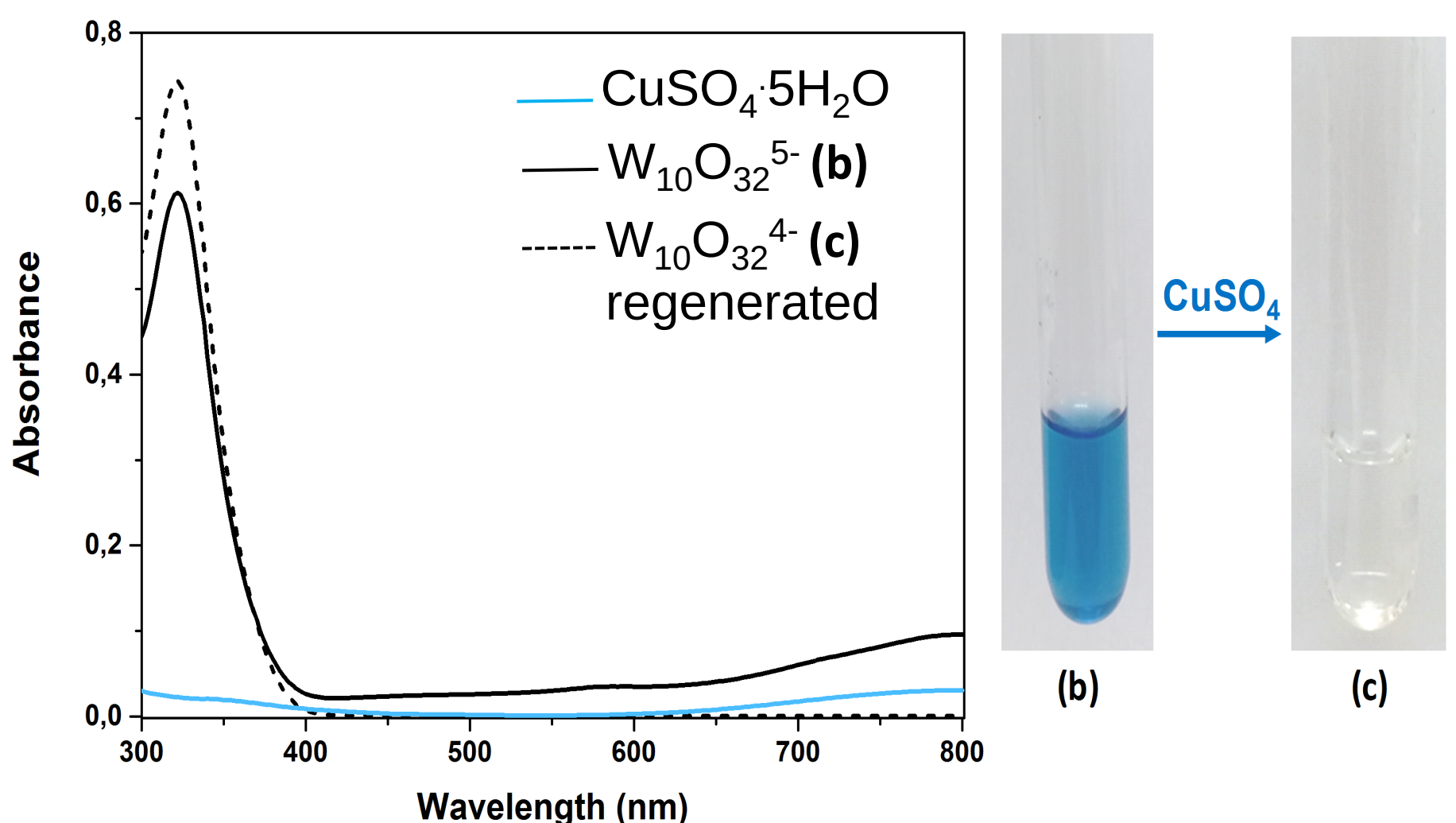
Generating catalytically active copper(I) by using the photochemistry of decatungstate



The irradiation of the solution of [W₁₀O₃₂]⁴⁻ in water/ethanol (10:1 v/v) caused the generation of a strong reducing species, namely [W₁₀O₃₂]⁵⁻ anion (absorption peak around 780 nm).



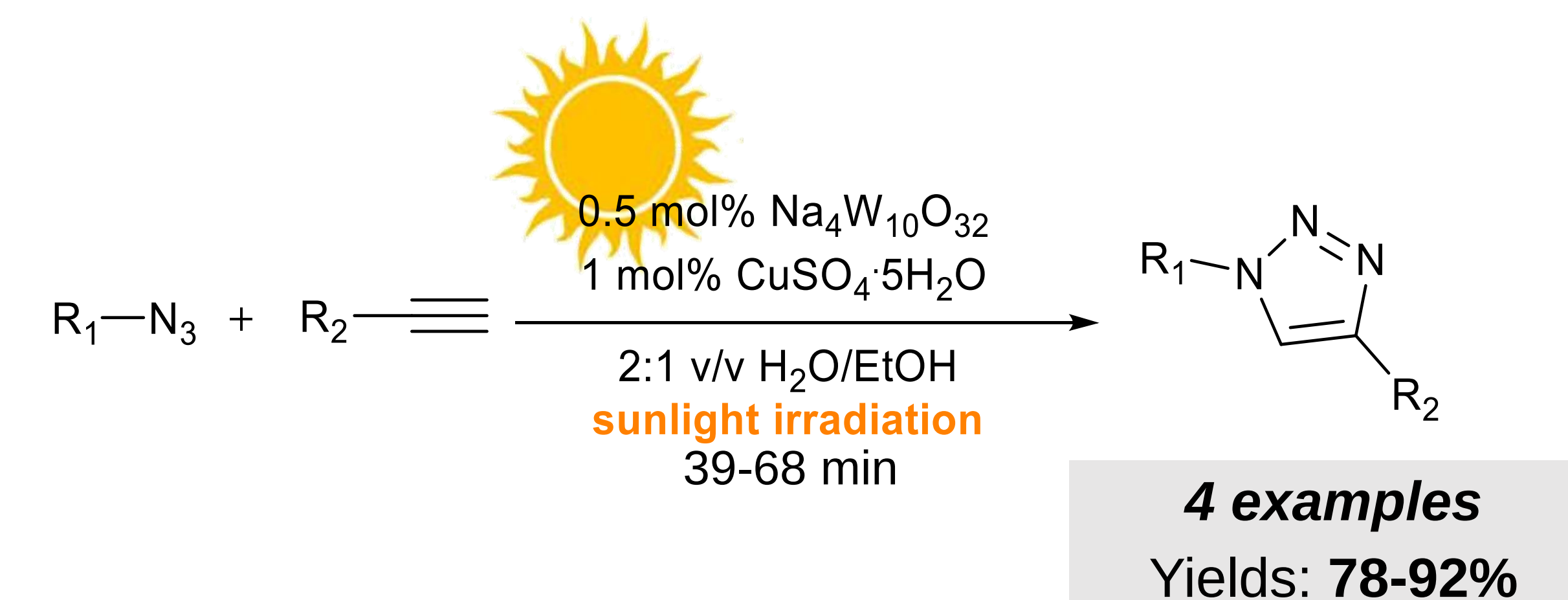
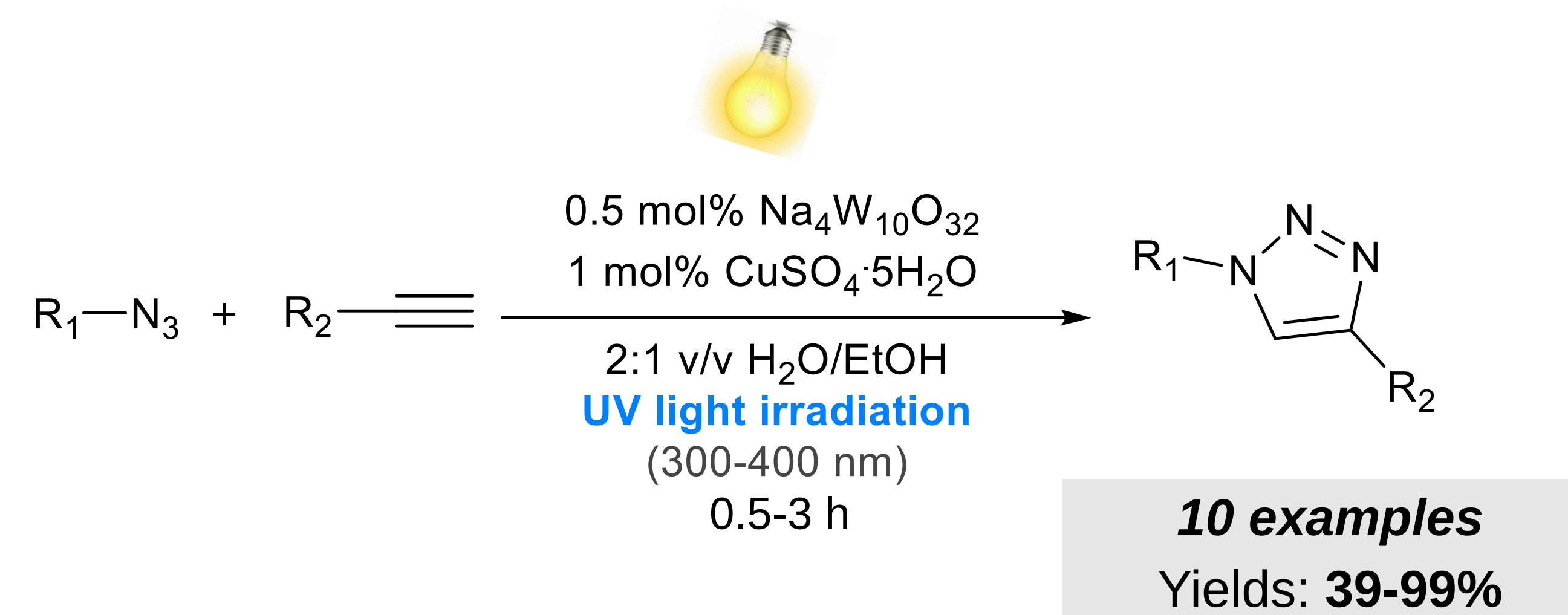
The subsequent addition of CuSO₄·5H₂O resulted in the regeneration of the starting photocatalyst anion [W₁₀O₃₂]⁴⁻ and the reduction of Cu(II) into Cu(I).



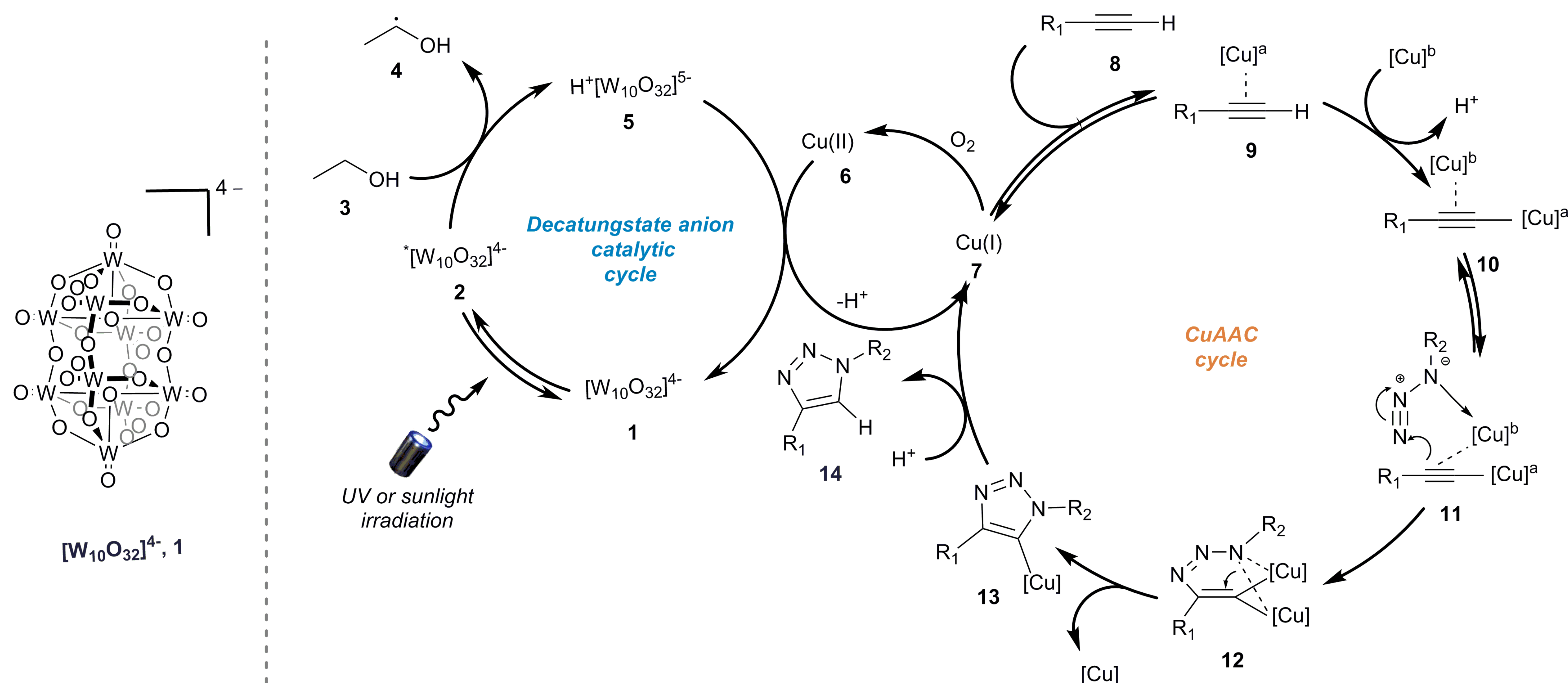
[1] Stiriba, S. E., Aflak, N., El Mouchtari, E. M., Ben El Ayouchia, H., Rafqah, S., Anane, H., & Julve, M. *Applied Organometallic Chemistry*, **2023**, 37(8), e7175.

References

Catalytic activity of Na₄W₁₀O₃₂/CuSO₄·5H₂O



Mechanism of the dual catalysis



Conclusion

- The merging of the photocatalysis of Na₄W₁₀O₃₂ and the CuAAC is a new dual-catalytic approach in the click of 1,4-disubstituted-1,2,3-triazoles under green condition.
- This new dual-catalytic approach for the click of 1,2,3-triazole is sustainable, in particular when using sun light as a source of irradiation and water as reaction medium.

Acknowledgments

