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Additive-free aryne precursors via light or heat

A novel class of aryne precursors that can be activated by visible light or mild heat, avoiding the need for chemical additives.

IP Status: Provisional Patent Application Filed; Application No. 63/886,266

Applications

- Pharmaceutical synthesis
- Agrochemical development
- Medicinal chemistry
- Chemical reagent sales

Key Benefits & Differentiators

- **Additive-free activation:** Precursors are activated using mild heat or blue visible light, eliminating the need for additives that cause functional group incompatibility.
- **Streamlined synthesis:** Precursors are made in a single step from a commercial carboxylic acid and derivatized in one additional step, avoiding lengthy linear sequences.
- **Broad functional group tolerance:** Avoids harsh additives and high-energy UV light, preserving sensitive functional groups on the aryne and its coupling partners.
- **Improved safety profile:** Avoids potentially explosive thermal precursors and side reactions associated with high-energy UV light activation.

Technology Overview

Densely substituted arene rings are vital components in modern pharmaceuticals and agrochemicals. Arynes, or triple bonds within a benzene ring, are powerful synthons for creating these decorated arenes. However, their widespread adoption is hindered by major limitations in existing aryne precursors. The majority of current precursors require activation by external additives, such as strong bases or fluorides, which are often incompatible with sensitive functional groups. Furthermore, creating derivatives of these precursors frequently requires lengthy, multi-step syntheses under harsh conditions, making them impractical for discovery chemistry.

Researchers at the University of Minnesota have developed a new class of aryne precursors (ortho-iodoniobenzoates) that overcome these barriers. This innovation is synthesized in a single step from a commercially available carboxylic acid and can be easily derivatized in one subsequent step. Crucially, these precursors are activated using either mild heat or low-energy blue visible light, completely avoiding the need for chemical additives. This additive-free activation method provides broad functional group tolerance and an improved safety profile, superseding existing precursors and enabling broad access to this desirable synthon for complex molecule synthesis.

Phase of Development

TRL: 5-6

Technology ID
2026-070

Category
All Technologies
Engineering & Physical Sciences/Chemicals
Engineering & Physical Sciences/Photonics
Engineering & Physical Sciences/Processes
Life Sciences/Biochemicals & Small Molecules
Life Sciences/Pharmaceuticals
Life Sciences/Research Tools

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Reagents have been successfully synthesized and scaled up.

Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

Please contact our office to share your business' needs and learn more.

Researchers

- **Courtney Roberts, PhD** Professor, Department of Chemistry

References

1. Chris M. Seong, Sallu S. Kargbo, Chia-Ling Yu, Daniel Gibney, Jan-Niklas Boyn, Courtney C. Roberts(2025) , https://www.nature.com/articles/s41586-025-09830-1, https://www.nature.com/