



Synthesis of Endoperoxide from a Diene and Molecular Oxygen in the Presence of a Photocatalyst

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WARF: P100348US01

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method of making endoperoxide that uses visible light and results in good yields of endoperoxides, which are useful as synthetic intermediates and as active agents in pharmaceutical compositions.

Overview

Endoperoxides are prominent structural features of several natural products with potent activity against malaria and various cancer cell lines. However, they are difficult to synthesize. The most straightforward method for the preparation of six-membered endoperoxides is a cycloaddition between dienes and singlet oxygen, but the promiscuous reactivity of oxygen prevents its use with more complex functionalized dienes.

The Invention

UW-Madison researchers have developed a method of making an endoperoxide by reacting a diene and molecular oxygen in the presence of a metal photocatalyst with an excited state lifetime of at least 100 nanoseconds. In one embodiment, the catalyst is a Ruthenium-based photocatalyst. This method uses visible light and can produce good yields of endoperoxide.

Applications

- Synthesis of endoperoxides, which have utility in the treatment of cancer and malaria and also are useful as synthetic intermediates

Key Benefits

- Promotes endoperoxide formation under atmospheric conditions in the presence of visible light
- Tuning of the photocatalyst electronics improves the variability of endoperoxide compounds that can be synthesized using this method.
- One photocatalyst that can be used in this method, $\text{Ru}(\text{bpz})_3^{2+}$, has a relatively long excited state lifetime and large extinction coefficient, allowing the reactions to be conducted using a standard light bulb rather than a high-pressure mercury arc lamp and making industrial scale production possible.

Stage of Development

The researchers obtained excellent yields of the desired 1,2-dioxane using $\text{Ru}(\text{bpz})_3^{2+}$ as the photocatalyst. We use cookies on this site to enhance your experience and improve our marketing efforts. By continuing to browse without changing your browser settings to block or delete cookies, you agree to the storing of cookies and related technologies on your device. [See our privacy policy.](#)

Additional Information

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- [Tehshik Yoon](#)

Tech Fields

- [Materials & Chemicals : Synthesis](#)

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854

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