



Tungsten and Molybdenum Alkylidene Catalysts for Olefin Metathesis

Tech ID: 33378 / UC Case 2023-978-0

BACKGROUND

Molybdenum (Mo) and tungsten (W) olefin metathesis catalysts are pivotal in industrial applications, ranging from the production of pharmaceuticals and polymers, due to their efficiency and selectivity in facilitating chemical reactions.

BRIEF DESCRIPTION

Professors Richard Schrock and Matthew Conley from the University of California, Riverside have developed new W and Mo based alkylidene olefin metathesis catalysts that can be produced by activation of metathesis-inactive precursors, accessible from metal chloride precursors via as few as three synthetic steps, using visible light. β,β' -disubstituted tungsten cyclopentane complexes can be prepared in the dark and form alkylidenes through irradiation. This technology is advantageous because it can potentially regenerate used catalysts by irradiation with visible light, offering a sustainable and cost-effective approach for industrial and research applications.

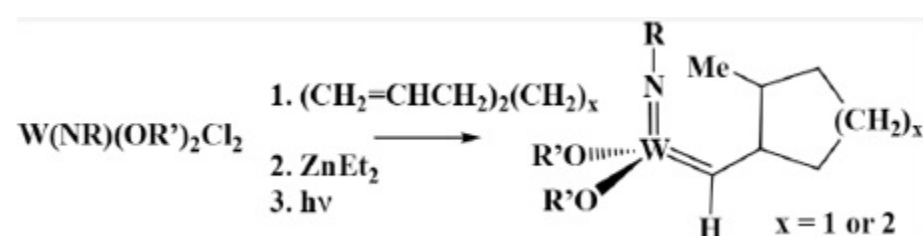


Fig 1: Synthetic scheme of alkylidenes from tungstacyclopentane complexes upon exposure to violet or blue light (405-445 nm). A number of tungstacyclopentanes have been prepared from $W(NR)OR'2Cl2$ complexes through alkylation and reduction with diethylzinc in the presence of an olefin.

SUGGESTED USES

- A potential sustainable and cost-effective approach for the production Mo-/W-based metathesis catalysts for industrial and research applications.

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OTHER INFORMATION

KEYWORDS

alkylidene, metathesis, catalysts,
tungsten, molybdenum,
photoactivation

CATEGORIZED AS

- **Materials & Chemicals**
 - Chemicals
 - Other

RELATED CASES

2023-978-0

► For use in various industries including agrochemical, renewables, pharmaceutical, flavors and fragrances, polymers, and advanced materials.

PATENT STATUS

Country	Type	Number	Dated	Case
Patent Cooperation Treaty	Published Application	WO 2025/014948	01/16/2025	2023-978

Additional Patent Pending

RELATED MATERIALS

► [Syntheses of \$\beta,\beta'\$ -Disubstituted Tungstacyclopentanes from Terminal Olefins and Their Conversions to Alkylidenes](#) R.R. Schrock, et al., [Organometallics](#) 2023 42 (15), 2038-2051 - 07/25/2023

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