



Plant Oils into Everyday Products



The chemical industry is undergoing a sustainability revolution, swapping fossil fuels for renewable resources like vegetable oils. At the heart of this shift is **olefin metathesis** – a molecular “shuffling” technique that rearranges carbon bonds in plant-derived oils to create valuable chemicals. Our team designed a new class of ultra-efficient catalysts that work like microscopic assembly lines, transforming methyl oleate (a key component derived from plant oils) into high-demand substances like **9-DAME** and 1-decene at

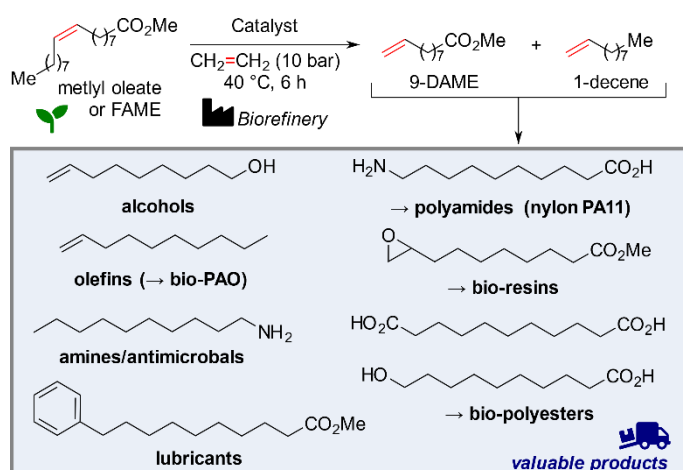
concentrations as low as **0.5 ppm** – equivalent to one sugar cube in an Olympic-sized swimming pool.

These catalysts thrive where others fail, resisting breakdown from oxygen, water, and impurities that typically plague industrial processes. This robustness makes them ideal for converting **FAME** (biodiesel feedstock) into:

- **Bio-lubricants** for electric vehicles and machinery
- **Surfactants** for eco-friendly detergents
- **Plastic building blocks** for biodegradable polymers
- **Advanced motor oils** that reduce engine wear

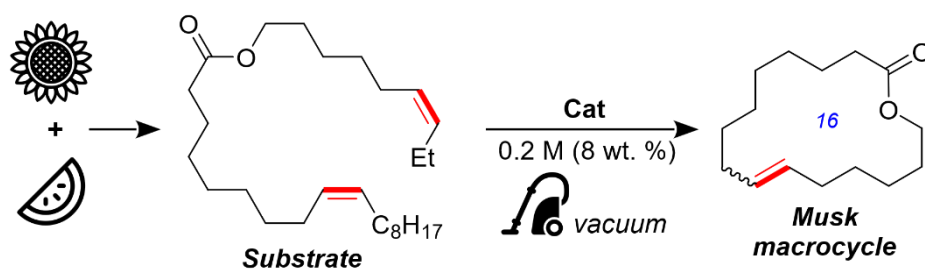
The benefit for Silicon Valley

The technology aligns with the region’s green tech ambitions, offering scalable solutions to replace petrochemicals in industries ranging from advanced manufacturing to personal care. By enabling solvent-free production and tolerating “real-world” industrial conditions, these catalysts slash energy use and costs – key factors for startups and established companies alike. This version emphasizes **scalability, industrial relevance, and Silicon Valley’s sustainability goals** while avoiding overly technical language. Focusing on ppm concentrations as relatable analogies helps general scientists grasp the innovation’s significance.



Methyl oleate can also serve as a feedstock for the synthesis of α,ω -dienes, which are subsequently transformed into macrocyclic musk compounds. These are valuable products for the flavor and fragrance (F&F) industry, as they constitute a significant component of the base notes in perfumes. Unfortunately, for many years, the industrial application of olefin metathesis for their production was uneconomical due to the necessity of conducting reactions at very high dilutions. To address this Achilles' heel, we have developed a method that enables

the distillation of the desired product from the reaction mixture, allowing us to conduct reactions at concentrations up to 200 times higher than previously achievable.



Research interests: organic and organometallic chemistry, olefin metathesis, design of new ruthenium complexes and their utilization in synthesis of natural products and pharmaceuticals, transformation of plant oils into useful products.

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