



# Partial Oxidation for Production of Olefins with Intact Alkane Functional Groups

Technology No. z04187

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## Olefins with Functional Group of Parent Alkane Intact

Olefins can be produced from alkanes by partial oxidation with the functional group of the parent alkane intact. Partial oxidation leads to higher yields and lower reaction temperatures than steam cracking; the described invention can be used with wide range of feedstocks, including biomass.

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## Alternative to Steam Cracking

Olefins, organic chemicals containing a carbon-carbon double bond, are currently the largest volume intermediate produced by the chemical industry; approximately 10% of petroleum is currently consumed in the production of olefins and related chemicals. Olefins are generally produced by steam cracking; a process which requires elevated temperatures, returns yields of only 50% and produces carbon dioxide, nitrogen oxide and hydrocarbons as polluting

byproducts.

## **Partial Oxidation Produces Olefins from Alkanes**

Partial oxidation is a technique which can produce olefins from a wide range of feedstocks, including biomass. The reaction is exothermic, so less heat is required and can be highly selective for specific products, leading to higher yields and less waste. The current invention is a method for producing olefins from alkanes with functional groups, leaving the functional group intact. Suitable feedstocks for this reaction include vegetable oil and other biomass derived feedstocks, providing a renewable alternative to using fossil fuels.

### **BENEFITS OF USING PARTIAL OXIDATION FOR PRODUCTION OF OLEFINS WITH FUNCTIONAL GROUPS**

- The reaction is exothermic, so less heat is required.
- The reaction can be specific for a certain olefin, so yields are higher than in steam cracking.
- Feedstocks can be derived from biomass.
- Functional groups on the alkanes are left intact.

**Phase of Development** Proof of concept. Demonstrated on laboratory scale.

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<https://license.umn.edu/product/partial-oxidation-for-production-of-olefins-with-intact-alkane-functional-groups>