Clean Technology

Producing Linear Alpha Olefins from Biomass

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a process for converting biomass into linear alpha olefins using an inexpensive catalyst.

Overview

Linear alpha olefins (LAOs) are valuable commodity chemicals traditionally derived from petroleum. They are versatile building blocks for making a range of chemical products like polyethylene, synthetic oils, plasticizers, detergents and oilfield fluids.

Relying on fossil fuel to manufacture LAOs is problematic. Not only are the standard methods unsustainable, but they also do not allow for the formation of LAOs with odd carbon numbers and they result in a distribution of LAOs with different chain lengths. A new approach using renewable sources is spurring great interest, but so far has required costly catalysts.

The Invention

UW–Madison researchers have developed a method for producing LAOs cheaply from biomass. In the process, an inexpensive solid acid catalyst is used in a reaction that converts the carboxylic acids and lactones present in the feedstock. The catalyst features Lewis acid catalytic sites and no precious metal components.

Applications

- LAO production

Key Benefits

- Cheaper heterogeneous catalyst
- One-step process
- Produces a stream of highly pure LAOs
- Utilizes biomass
- Carbon chain length can be specified.
- Allows both even and odd carbon numbers

Stage of Development

A stream containing 1-butene was obtained at 48 percent total butane yield using a gamma-aluminum catalyst. Yield increased to 70 percent when the catalyst was modified with tungsten oxide. Both types of catalyst can reused with no loss of yield.

Tech Fields

- Clean Technology : Biobased & renewable chemicals & fuels

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