Direct Synthesis of Light Olefins from Carbon Dioxide using Yttria-Stabilized Zirconia Support

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BRIEF DESCRIPTION

The production of light olefins (ethylene, propylene and butylene) via the activation of carbon dioxide as a feedstock is a challenging reaction that requires intermediate steps and often suffers from low yields. The researchers at the University of California, Irvine, discovered a novel bifunctional catalyst comprising of Zirconium and Indium combined with a zeolite matrix to promote the production of light olefins in higher efficiency and yields.

SUGGESTED USES

Light olefins can be used as crucial blocks for polymers, solvents, and drugs.

FEATURES/BENEFITS

·Efficiency: this invention will provide a higher yield of light olefins (approximately 3-times as much) than current methods

·Ease of use: this invention does not require an intermediate step to derive olefins from CO2. Doing so in a direct method also requires less energy to operate when compared to traditional, multi-step methods that are currently available.

TECHNOLOGY DESCRIPTION

Light olefins are crucial building blocks for polymers, solvents, and drugs; these compounds are made via the cracking of naphtha and dehydrogenation of light paraffins. Carbon dioxide (CO_2) has been used as feedstock to produce light olefins either via a combination of reverse water-gas shift reaction (RWGS) and modified Fischer-Tropsch synthesis. During these processes, CO_2 is converted to methanol, and methanol is subsequently converted into light olefins.However, these methods are known to suffer from undesirable CO selectivity and low yield of light olefins.

The researchers at the University of California, Irvine, created a unique way to increasing the yield of light olefins while requiring less energy.The researchers devised a novel catalyst comprising zirconium and Indium supported on a zeolite matrix to improve production of light olefins.

STATE OF DEVELOPMENT

Ongoing studies are underway

PATENT STATUS

Country	Type	Number	Dated	Case

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OTHER INFORMATION

CATEGORIZED AS

- **Energy**
  - Hydrocarbon
- **Materials & Chemicals**
  - Chemicals

RELATED CASES

2020-619-0

United States Of America	Issued Patent	11,697,625	07/11/2023	2020-619	

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