High Yield Co-Conversion of Lignocellulosic Biomass Intermediates to Methylated Furans

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CONTACT

Grace Yee
grace.yee@ucr.edu
tel: 951-827-2212.

OTHER INFORMATION

KEYWORDS

furfural, hydroxymethyl furfural, hydrodeoxygenation, catalysts, biofuels

CATEGORIZED AS

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

RELATED CASES

2017-488-0

BACKGROUND

Lignocellulosic biomass is the most abundant and inexpensive renewable resource that can potentially displace petroleum as a carbon neutral alternative for the production of fungible liquid transportation fuels and commodity chemicals. However, the production of target chemicals and gasoline range fuels from lignocellulosic biomass has been economically challenging due to the need for multiple processing steps and associated high product yields required in each step. Integrated catalytic technologies capable of handling raw or crude biomass feed streams while maintaining high catalytic activity is crucial for realizing low-cost biofuels. We developed a low-cost copper-based catalyst capable of co-processing C5 and C6 sugar products to fungible gasoline blendstocks.

BRIEF DESCRIPTION

Prof. Charles Cai and colleagues from the University of California, Riverside have developed a method for high yield co-conversion of lignocellulosic biomass to produce high octane fuel additives dimethyl furan (DMF) and methyl furans (MF). This technology works by using Cu-Ni/TiO2, a unique catalytic material that enables high yield (~90%) conversion of 5-(hydroxymethyl)furfural (HMF) and furfural (FF) sourced from lignocellulosic biomass into methylated furans (MF) in either single or co-processing schemes. This invention is advantageous compared to existing technologies due to its high yield and efficiency, low cost, and stable conversion process.

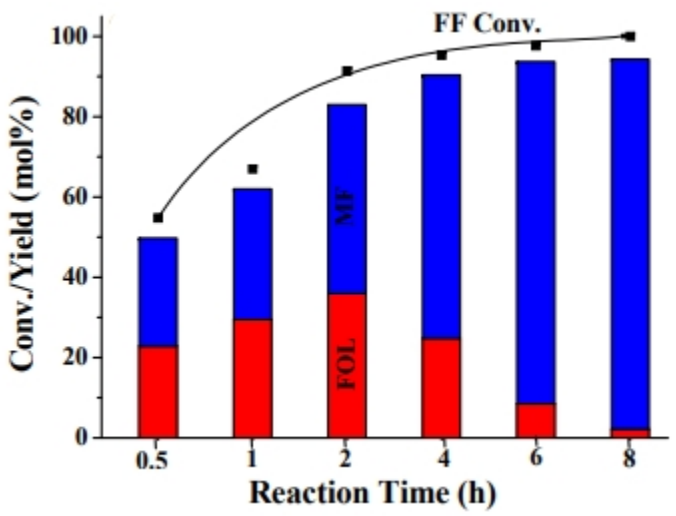


Fig 1: UCR's furfural conversion and product yields as function of reaction time over Cu-Ni/TiO2.

APPLICATION

- For use as a method to produce high octane fuel additives from lignocellulosic biomass.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,623,205	04/11/2023	2017-488

RELATED MATERIALS

- Bhogeswararao Seemala, Charles M. Cai, Charles E. Wyman, and Phillip Christopher ACS Catalysis 2017 7 (6), 4070-4082 DOI: 10.1021/acscatal.7b01095 - 05/08/2017

University of California, Riverside

Office of Technology Commercialization

200 University Office Building,

Riverside,CA 92521

otc@ucr.edu

https://research.ucr.edu/

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