Flow Chemistry Synthesis Of Diisocyanates From Algae Oil Derived Diacids

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BACKGROUND

Isocyanates serve as important and versatile chemical intermediates in the manufacture of diverse products ranging from flexible and rigid polyurethane foams to agrochemicals and pharmaceuticals. The production of isocyanates today draws mainly from petrochemical raw materials, including benzene, toluene, propylene, and aniline, and they are produced industrially using phosgenation of alkyl or aromatic amines. This involves highly toxic phosgene and produces corrosive HCl, limiting synthetic applications.

TECHNOLOGY DESCRIPTION

Researchers from UC San Diego searching for a renewable source for diisocyanates, have invented a practical methodology for the production of isocyanates from algae-biomass-derived fatty acids or other renewable sources. This technique utilizes flow chemistry to prepare and convert high-energy intermediates, thus mitigating safety concerns. The technology leverages the use of continuous flow to prepare acyl azides from hydrazides, affording isocyanates in one scalable process.

APPLICATIONS

ADVANTAGES

The method is efficient, safe, and sustainable, offers an opportunity to prepare isocyanates and diisocyanates from renewable feedstocks, and is amenable to distributed manufacturing processes.

STATE OF DEVELOPMENT

INTELLECTUAL PROPERTY INFO

UC San Diego is seeking partners to commercialize this technology. Worldwide rights are available.

RELATED MATERIALS

- Preparation of Mono- and Diisocyanates in Flow from Renewable Carboxylic Acids. Thien An Phung Hai, Laurent J. S. De Backer, Nicholas D. P. Cosford, and Michael D. Burkart Organic Process Research & Development Article ASAP; DOI: 10.1021/acs.oprd.0c00167 - 05/29/2020

PATENT STATUS

Patent Pending

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OTHER INFORMATION

KEYWORDS

renewable isocyanate, algae oil, flow chemistry, sustainable carboxylic acid, acyl azide, hydrazide

CATEGORIZED AS

- **Materials & Chemicals**
  - Chemicals
  - Polymers

RELATED CASES

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