Halide-Free Gas Phase Methanol Carbonylation for Environmentally Friendly Acetic Acid Production

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BACKGROUND

Acetic acid is used for many applications, from polymers to food production; over five million tons of acetic acid is produced through methanol carbonylation each year. This production approach uses homogeneous catalysts in liquid phase reagents, such as methyl iodide and water, which must be removed before production is complete. The use of water and halides accumulates a significant monetary and environmental cost in the production of acetic acid.

DESCRIPTION

Researchers at the University of California, Santa Barbara have developed a heterogeneous catalyst formulation that enables high yield conversion of methanol and carbon monoxide to acetic acid; all in gas phase. The catalyst relies on ReOx dispersed on inert support, SiO_2, in a structure that inhibits byproduct formation, leading to high selectivity of acetic acid. This catalyst enables a gas phase, continuous flow methanol carbonylation process, which does not require water or halides, providing a less expensive and more environmentally friendly acetic acid production option.

ADVANTAGES

- Gas phase methanol carbonylation
- Water-free
- Halide-free

APPLICATIONS

- Polymer production
- Acetate ester production
- Vinyl acetate monomer (VAM) production
- Food production

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12,083,504	09/10/2024	2020-074

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

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OTHER INFORMATION

KEYWORDS

acetic acid, polymer, methanol, carbonylation

CATEGORIZED AS

- **Materials & Chemicals**
  - Chemicals

RELATED CASES

2020-074-0

- Highly Selective Catalyst Composition for Efficient Ethylene Oxide Production
- Novel Carbon Dioxide-Free Hydrocarbon Conversion Processes and Reactor Technologies for Solid Carbon and Hydrogen Production

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