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A Process to Produce Alkenes from Shale Gas

A high-pressure, simplified train cuts reactors and separations to make ethylene/propylene/butylene more economically.

Purdue University researchers developed an economically and energy efficient workflow for producing butylene, propylene, and ethylene from natural gas liquids in shale gas. Contemporary methods to produce these chemical products include steam cracking and catalytic dehydrogenation requiring expensive separation procedures and energy intensive heating steps to achieve high yield. To combat these inefficiencies, Purdue researchers devised a process that utilizes fewer reactive beds and fewer separation steps which in turn decrease the costs associated with producing alkenes.

Advantages:

-Operation of Reactors at High Pressures

-Less Equipment Needed for Alkane Dehydragenation

-Recycling of Alkane Components

-Cost Effective

Potential Applications:

-Alkene Production

-Shale Gas Processing

Technology Validation:

Process simulations that were implemented by Aspen Plus. Feed information taken included composition, flowrate, temperature, and pressure (based on the typical shale gas stream from Bakken). High pressure operation decreased propylene/ethylene yield per pass however the reactor volume will be smaller in these cases potentially eliminating the need for some

Technology ID
2020-AGRA-69108

Category
Chemicals & Advanced Materials/Specialty & Performance Chemicals
Chemicals & Advanced Materials/Materials Processing & Manufacturing Technologies

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equipment, making the process simpler.

TRL: 2

Intellectual Property:

Provisional-Gov. Funding, 2020-06-22, United States

Utility-Gov. Funding, 2021-06-21, United States

Keywords: Alkane, Alkene, Chemical Engineering, CISTAR, Dehydrogenation, Hydrocarbons, Natural Gas Liquids, Shale Gas