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Pt and Pd Nanoalloy Alkane Dehydrogenation Catalysts

Highly selective and stable catalysts enable a new, cost-efficient process to convert shale gas hydrocarbons like ethane and propane into transportation fuels and chemical feedstocks.

The production of shale gas drives natural gas production in the U.S. and worldwide. According to the U.S. Energy Information Administration's International Energy Outlook 2016 and Annual Energy Outlook 2016, shale gas is expected to account for 30 percent of world natural gas by 2040. In the U.S., shale gas accounted for 50 percent of the natural gas production in 2015 and expected to increase to 70 percent by 2040. Shale gas is transformed into gasoline, diesel fuel, and fine chemicals by catalysts in a process called alkane dehydrogenation; however, current processes are very capital intensive with high operating costs. There is need for a more efficient system for utilizing petroleum and gas reserves.

Researchers at Purdue University have developed highly selective and stable catalyst compositions and structures for production of olefins from shale gas hydrocarbons, especially ethane and propane. The first step of a new process uses these catalysts to covert shale gas to transportation fuels. The process design significantly reduces capital and operating costs when compared to industry practices. This new family of catalysts is more thermally stable and has a longer life than current catalysts, allowing their use in the production of ethylene and propylene from ethane and propane derived from shale gas.

Advantages:

-Requires less capital

-Lowers operating cost

-Highly selective and stable

-Thermally stable and a longer life

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Category

Chemicals & Advanced Materials/Specialty & Performance Chemicals

Energy & Power Systems/Power Generation

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Potential Applications:

-Oil companies

-Chemical companies

-Technology companies

TRL: 3

Intellectual Property:

Provisional-Patent, 2017-08-01, United States | Provisional-Patent, 2017-08-15, United States | PCT-Patent, 2018-07-31, WO | NATL-Patent, 2020-01-31, United States | CON-Gov. Funding, 2021-12-20, United States | PCT-Patent, N/A, WO

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