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Supported Ni Catalysts for High-temperature Olefin Oligomerization

A novel high-temperature catalyst enables single-reactor gas-to-fuel conversion, eliminating intermediate separation steps and reducing capital and energy costs.

Nickel (Ni) is used to react with olefins to make larger olefins for chemicals and fuels. This process is called oligomerization and is used with Ni catalysts. All known catalysts operate below 300 C since at higher temperatures, Ni ions undesirably reduce to metallic Ni. In addition, current catalysts are unstable and cannot operate in the presence of H2. As a result, these processes require extensive capital and energy to separate unconverted alkanes and H2 before olefins can be converted to fuel in the existing oligomerization catalyst. Therefore, there is need of a method for reducing the capital and energy required for producing fuel.

Researchers at Purdue University have developed a catalyst that is effective at converting gas to useable fuels. It is stable at much higher temperatures than existing catalysts (500 C), which allows olefins to be reacted directly in the same reactor, eliminating the extra step of separating unconverted alkanes or H2. This technology would help oil, chemical, and technology development companies who are actively developing new processes for fuels and chemicals from abundant US shale gas.

Advantages:

-Stable at high temperatures

-All reactions in same catalyst

Potential Applications:

-Oil companies

-Chemical companies

-Technology companies

Technology ID

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Category

Chemicals & Advanced Materials/Specialty & Performance Chemicals

Energy & Power Systems/Power Generation

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