Technology Transfer

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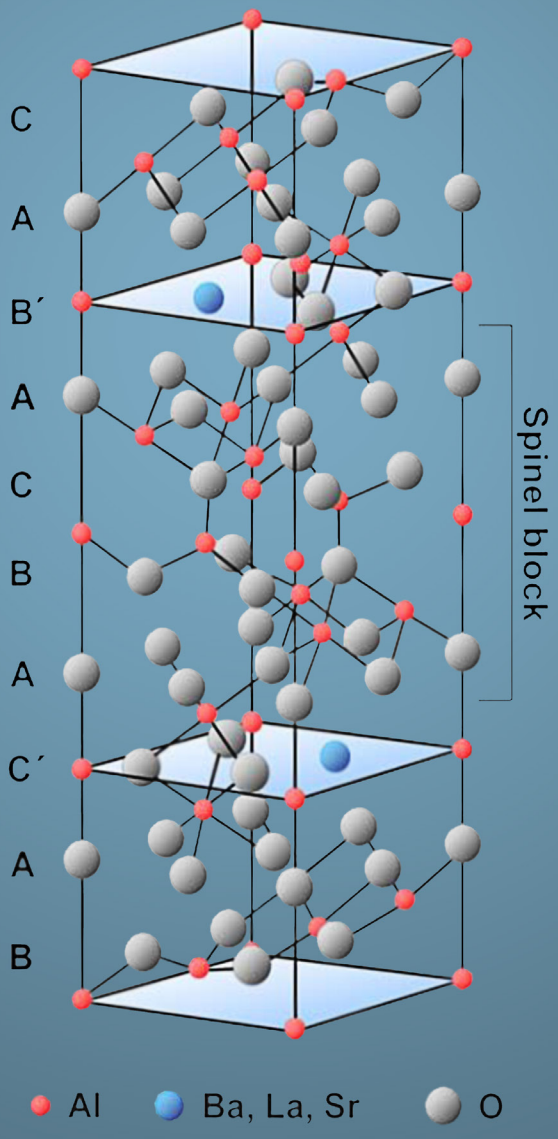

Nano-Structured Nobel Metal Catalysts for Hydrocarbon Reforming

Oppportunity

Research is active on the patent pending technology, titled "Nano-Structured Nobel Metal Catalysts Based on Hexametallate Architecture for the Reforming of Hydrocarbon Fuels." This technology is available for licensing and/or further collaborative research from the U.S. Department of Energy's National Energy Technology Laboratory.

Overview

Methods for generating synthesis gas from hydrocarbon feedstocks routinely involve the use of a catalyst—a material that speeds up the reaction, but itself is not consumed—to make this process economically feasible. Sulfur, higher hydrocarbons, and olefins present a major technical challenge since these components can deactivate conventional metal-based reforming catalysts. Development of high durability and economically feasible reforming catalysts for converting hydrocarbons into hydrogen-rich synthesis gas are necessary to improve process efficiency.

This invention describes a process and application of nano-structured noble metal catalysts using hexametallate for the reforming of hydrocarbon fuels. This technology helps overcome the limitations of current catalysts by efficiently reforming hydrocarbon fuel sources while maintaining thermal stability and resistance to sulfur, olefins, and carbon deposition. The catalyst design process involves the doping of nano-structured noble metal catalysts into the hexametallate lattice.

Mirror cations in the crystal lattice are selected from alkaline metals, alkaline earth metals, and lanthanide metals to reduce acidity of the crystal lattice and enhance oxidation of carbon deposits. The unique crystalline structure of hexametallate allows for chemical modifications tailored to reforming properties for specific fuels and

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reaction conditions. Properties such as activity, selectivity, and thermal stability can be effectively altered with various metal substitutions into the hexametallate lattice.

Significance

- A low cost process to produce thermally stable noble metal catalysts.
- Catalysts that resist deactivation by carbon, sulfur and olefinic compounds.
- Process allows for tailoring of catalytic activity and specificity
- Catalysts efficiently reform hydrocarbon fuels to synthesis gas.

Applications

- Any use where catalyst design for hydrocarbon reforming is required.
- Dry reforming, partial oxidation, steam reforming, autothermal reforming.

Related Patents

U.S. nonprovisional patent application No. **11/947,125**, titled "Nano-Structured Noble Metal Catalysts Based on Hexametallate Architecture for the Reforming of Hydrocarbon Fuels," filed November 29, 2007
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