Designer Catalysts for Next Generation Fuel Synthesis

Summary

Transition Metal Sulfides (TMS), such as molybdenum disulfide (MoS_2), are the petroleum industry's "workhorse" catalysts for upgrading heavy petroleum feed stocks and removing sulfur, nitrogen and other pollutants from fuels. This improved synthesis technique produces single layer transition metal sulfide (SLTMS) catalysts, such as molybdenum disulfide, with potentially greater activity and specificity than those currently available.

This "bottoms-up" synthesis approach of single layer– TMS catalysts makes them extremely uniform, implying the reactivity should be tunable for specific reactions. Next generation fuel cells will likely rely even more heavily on these types of reactions.

BENEFITS

- Uniformity allows specifically tunable reactions
- The next generation of fuel cell synthesis points towards a growing trend in these "workhorse" catalysts
- Provides greater efficiency through nanomaterials
- Advancement of alternative energy sources

APPLICATIONS

- Bio-fuel production
- Hydrogen generation
- Direct coal liquefaction
- Oil refining

U.S. PATENT

7,838,083

Licensing & Partnering Status:

Various license and partnering options are available. Please contact the Intellectual Property department to discuss.

Technology Readiness Level:

Sandia estimates the TRL at approximately 3-4. Early laboratory prototypes exist which demonstrate "proof-of-concept" and that the key elements work together.

INTELLECTUAL PROPERTY & LICENSING CONTACT

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National Nuclear Security Administration

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