

Oxidative Dehydrogenation of propane



THE INVENTION

The invention is a specific catalyst used in the production of propylene from propane using oxidative dehydrogenation. This novel catalyst is a mixed metal oxide catalyst comprised of molybdenum, vanadium, and oxygen.

MARKET NEED

The \$120 billion global propylene market has regularly been in a shortage situation over the past four years. Propylene is traditionally a by-product of ethylene from steam crackers or as a by-product of refined fuel products from oil refineries, however, these sources have not been able to keep up with global demand growth. These recent shortages have attracted a substantial amount of investment in propane dehydrogenation (PDH) process^[1]. Many major chemical companies globally are looking towards building or expanding 'on-purpose' propylene production, using propane as a feedstock^{[1][2]}.

¹Wood-Mackenzie's latest global propylene long-term market study

²The changing landscape of US propylene and propane markets

APPLICATIONS

Possible applications for the catalyst are where olefins are produced from alkanes feed:

- Production of propylene from propane using oxidative dehydrogenation process
- Oxidative dehydrogenation is alternative process to produce olefins as 'main' product

ADVANTAGES

- Catalyst achieves 100% selectivity for propylene at temperatures of 350-450°C (See Table-1)
- Emerging and growing market for propylene dehydrogenation technologies
- Long catalyst lifetime

Table 1. Results of OXDH of propane over $Mo_{0.5}V_{0.5}O_{5.5}$ (SCD).

Temperature (°C)	Propane Conversion (%)	Propylene Selectivity (%)
350	2.74	100.00
400	2.94	100.00
450	3.43	100.00

PROJECT STATUS

Catalyst was prepared and characterized. In addition, activity tests were done at laboratory bench scale to quantify propylene yield.

NEXT STEPS

Scale-up and pilot plant tests to further confirm catalyst activity and stability.

KFUPM seeks an industry partner to develop the technology leading to commercial exploitation. Regional & global petrochemicals companies are welcome.

PATENT PROTECTION

The issued US patent 8623781 covers catalyst composition and method of synthesis. The patent is owned by King Fahd University of Petroleum & Minerals (KFUPM).

CONTACT

For further information please contact:

KFUPM Innovation Center

→ Email: ip-license@kfupm.edu.sa

→ Telephone: +966-13-860-7297