

Eltron Fischer Tropsch Catalyst

Eltron is developing a proprietary Fischer Tropsch catalyst that has significant Reverse Water Gas Shift activity. In our benchmark tests versus the state-of-the-art baseline precipitated iron and cobalt catalysts, the Eltron catalyst showed: 1) higher chain growth probability (α) than precipitated iron and comparable to that demonstrated by supported cobalt; 2) higher overall yield of non-CO₂ products than baseline iron; 3) lower CO₂ yield than baseline iron catalyst; 4) less sensitivity to H₂ : CO yield than baseline cobalt catalyst; 5) cost comparable to baseline precipitated iron catalyst and much lower than supported cobalt; 6) over four days on-line time without performance degradation.

Eltron's proprietary Fischer Tropsch catalyst was developed under a grant from NASA to examine In Situ Resource Allocation (ISRU) for use of resources on Mars. Carbon dioxide is prevalent in the Martian atmosphere, so one of the goals of ISRU is to use that material to make other organic building blocks from the carbon dioxide. This has led to NASA's interest in Reverse Water Gas Shift.

We have obtained very promising results for this catalyst. The research was part of a nine-month project for NASA. We believe that we have a strong proprietary position and know of no work by others in this area.

Summary of Key Non-Proprietary Data to Date

In the following data, the CO₂ produced is in excess of the amount fed to the reactor.

Table 1: H₂/CO = 1.6 No CO₂; T = 250°C; P = 250 psig; Data after 65-69 hrs. on stream

	CO Conv %	CO ₂ Produced	CH ₄ Produced
Y06 State of Art Prec. Fe Catalyst	91	48	4.0
Eltron X4013	76	38	3.4
Y15 State of Art Cobalt Catalyst	69	11	4.6

**Table 2: Fischer Tropsch with CO₂ in Feed
37.5% CO₂; 37.5% H₂; 25% CO; T =250°C; P = 250 psig;**

	CO Conv %	CO ₂ Produced	CH ₄ Produced
Y06 State of Art Prec. Fe Catalyst	83	29	2.4
Eltron X4013	74	-37	4.0
Y15 State of Art Cobalt Catalyst	86	2	25.0

**Table 3: Reverse Water Gas Shift Data,
H₂/CO₂ = 1; No CO in feed; T=250°C P=250 psig**

	CO Produced	CO ₂ Conversion	CH ₄ Produced
Y06 and Y15 have no RWGS activity			
Eltron X4013	6	37	3.1