

Synthesis of light olefins from syngas in dual-bed reactor

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Process for the selective production of C_2 - C_4 olefins directly from the synthesis gas ($CO+H_2$) has led to the development of a dual catalyst system having a Fischer-Tropsch (K/Fe-Cu- AlO_x) catalyst and cracking (ZSM-5) catalyst in dual-bed reactor. In the first reactor, the FTS products consist of a mixture of olefins and paraffins that has been previously optimized to production toward olefins, and then all of FTS products are directly introduced into a second reactor. The FTS products are cracked in a second reactor comprised of a catalytic cracking unit wherein it is converted in cracking catalyst to light olefins. Reaction condition has been optimized for achieving higher CO conversion and olefins selectivity. The C_2 - C_4 hydrocarbons selectivity in dual-bed reactor was increased from 24.2 to 52.2%, and olefins selectivity in C_2 - C_4 was slightly decreased from 80.6 to 78.0%. The FTS products from syngas in dual-bed reactor can be successfully cracked toward light olefins.