

## Fe-ZSM-5 catalysts for the selective production of liquid-range hydrocarbons through Fischer-Tropsch synthesis

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Low-temperature Fischer-Tropsch synthesis (LT-FTS: 200–280 °C) is a promising technology to convert syngas (CO + H<sub>2</sub>) into liquid hydrocarbons. Precipitated iron-based catalysts are highly promising for LT-FTS, due to their high activity and low methane selectivity as well as low cost. One of the major drawbacks of LT-FTS is the wide distribution of C<sub>5+</sub> hydrocarbons which have a large proportion of waxes. This requires an additional process of hydrocracking waxes into liquid hydrocarbons. One feasible approach is the use of bifunctional catalysts that consist of LT-FTS catalysts and cracking catalysts. In this study, we prepared bifunctional catalysts by physically mixing precipitated iron-based catalysts (P-Fe) and ZSM-5 samples. We varied the ratio of Si to Al in the ZSM-5 as well as the ratio of P-Fe to ZSM-5 in the bifunctional catalysts. The highest C<sub>5-20</sub> selectivity in hydrocarbons obtained in the bifunctional catalysts was about 72 wt%, which is about twice as high as that obtained in the raw P-Fe.