

World's First Pilot Project Producing Gasoline from CO₂ Hydrogenation Completes Trial Operation

The world's first demonstration device for producing 1,000 tons/year gasoline from carbon dioxide (CO₂) hydrogenation in Zoucheng Industrial Park, Shandong province, China, completed its trial operation and technology assessment on March 4.

The project was jointly developed by the Dalian Institute of Chemical Physics (DICP) of the Chinese Academy of Sciences (CAS) and Zhuhai Futian Energy Technology Co., Ltd.

Hydrogenation of CO₂ into liquid fuels and chemicals can not only realize the resource utilization of CO₂ but also facilitate the storage and transportation of renewable energy.

However, the activation and selective conversion of CO₂ are challenging. A technology that can selectively produce value-added hydrocarbon fuels with high energy density will provide a new route for promoting a clean and low-carbon energy revolution.

The technology of carbon dioxide hydrogenation to gasoline was proposed by SUN Jian, GE Qingjie and WEI Jian from DICP in 2017 in a paper published in *Nature Communications*.

The demonstration device was completed in Zoucheng Industrial Park in 2020. In October 2021, the device passed the continuous 72-hour on-site assessment organized by China Petroleum and Chemical Industry Federation (CPCIF). It could realize both CO₂ and



A Chinese pilot plant in Shandong province for producing 1000 tons/year of gasoline from carbon dioxide (CO₂) hydrogenation. (Image by HOU Shoufu)

H₂ conversion of 95%, gasoline selectivity of 85% in all carbon-based products, with reduced consumption of the raw material of CO₂ and H₂.

It produced clean and green gasoline products with an octane number of higher than 90 conforming to the Chinese national VI standard, accompanied by low energy consumption of the whole process.

“This technology marks a new stage of CO₂ resource utilization technology in the world, and provides a new strategy for realizing the goal of carbon neutral,” said Prof. SUN.

(DICP)

Reference

J. Wei, Q. Ge, R. Yao, Z. Wen, C. Fang, L. Guo, H. Xu, J. Sun, (2017) Directly converting CO₂ into a gasoline fuel. *Nature Communications* 8, 15174. doi: 10.1038/ncomms15174.