

# **Flexible Options for Producing Energy in a Carbon-Constrained World for the Future Fuel System**

ZHANG, SuoJiang, ZHANG, XiangPing

*Institute of Process Engineering, CAS, Beijing, 100190, China*

## **Abstract:**

The need to reduce the global emissions of CO<sub>2</sub> and the mobile emissions of particulate matter as well as the depletion of oil reserves may lead to significant changes in the types and quality of transportation fuels required and available for the future. The option to produce cleaner fuels with flexible resources (Coal, natural gas, oil, biomass and so on) is hence of significant value to the whole energy system worldwide. We present an analysis of potential future designs of a Future Fuel Park integrated with or modifying the existing refinery plant and power plant with CO<sub>2</sub> capture, utilization and storage, considering multi-feedstocks and with the same equipments and processes, with the objective products being electricity, power, heat and liquid fuels. The analysis is based on a process integration results with rigorous thermodynamic and kinetic models. The different options are evaluated on the basis of the energy, carbon, and hydrogen balances. This work will provide new scenarios for the future new and cleaner energy system. The detailed analysis of energy efficiency, carbon utilization efficiency and CO<sub>2</sub> mission status for different option are provided.

## **Keywords:**

Fuel Park, cleaner energy, process integration, carbon and hydrogen balances, Carbon-Constrained