

Low-carbon conversion of carbon-based raw materials into chemicals

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Abstract: At present, China's coal-based energy structure and the development stage of a large developing country determine that China's economic development has not yet been decoupled from the main energy demand, and carbon dioxide emissions are still relatively high. This paper proposes the joint research and development of key technologies for the low-carbon conversion of carbon-based raw materials into chemicals. Through the process optimization of chemical plants, solar energy or zero-carbon renewable energy is used for heating, and the conversion of effective elements of carbon-based materials is coupled with the full utilization of energy, so as to achieve net zero emissions, and clean co-production of hydrogen, oxygen-containing organic compounds at the technical level of the system. The key scientific/technical issues to be solved are the followings: 1) the relationship between system entropy flow and product selection during the utilization of carbon-based raw materials; 2) the formation mechanism of fine dust in liquid oil and gases, and their efficient separation and in-situ removal principle by using the porous media; 3) The effect of the change of thermal conductivity after oxygen flow on the gasification process; 4) The limit relationship between the characteristics of the active site of the catalyst and the activation ability of the reactant CO₂. Using renewable energy for heating, unit process integration and optimization, to achieve overall clean production of high value-added fine chemicals, with significant social, economic and obvious environmental benefits.

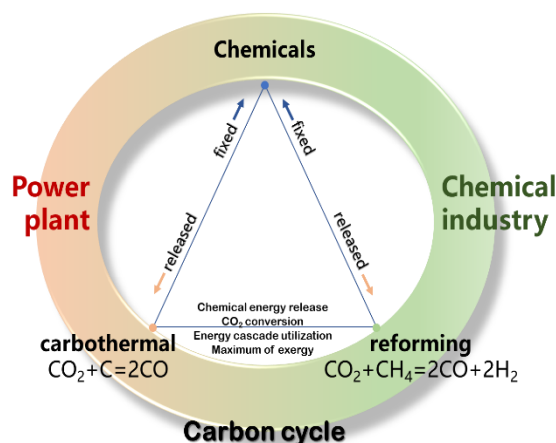


Fig. 1. Conceptual image of this proposal.

Keywords: Chemical Engineering; Sustainability; Partnership

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