

Catalytic Synthesis of Valuable Chemicals and Fuel from Renewable Feedstock

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Abstract:

Energy security is one of the crucial sectors for growth of country. In Malaysia, coal-fired power station provides main electrical energy generation to the whole country. Thus, an efficient and integrated approach is required to tackle the release flue gases especially carbon dioxide (CO₂). The CO₂ management through carbon capture and utilisation (CCU) are one of the main interests for both academician and industrialist. However, with the coal-combustion in mind, close-loop and potentially zero-waste strategy through reutilisation of released CO₂ to produce combustible and high energy methane (CH₄) gas will ensure sustainable and green coal-power energy generation industry. Besides, CO₂ valorization into useful commodities for other industries provides added value to overall coal industry ecosystem. As one of the technical university in Malaysia, Universiti Malaysia Pahang (UMP) strategically positions our self to support national and international agenda towards sustainable energy and chemicals initiatives. A number of different research approaches were initiated including utilisation of catalytic material for CO₂ valorization to produce chemicals (i.e. organic carbonates) or through CO₂ sequestration by microalgae. High lipid algae biomass is one of potential feedstock for the production of renewable biofuel. In concise, synergistic integration of different CO₂ related research will provides comprehensive solution especially for Malaysia's perspective.

Keywords: carbon capture and utilisation (CCU); Coal-Fired Power; Carbon Dioxide (CO₂); Electrical Energy Generation

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