

Low-temperature thermochemical CO₂/H₂O splitting on transition metal-based oxygen carriers in chemical looping processes

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This talk addresses the low temperature thermochemical CO₂/H₂O splitting to CO/H₂ by adopting the concept of chemical looping process. In a typical thermochemical CO₂/H₂O splitting reaction, the reduced oxides are utilized as oxygen carriers to reduce reactants into CO/H₂O. The oxidized oxygen carriers are then thermally reduced subsequently for another splitting progress. However, since this thermal reduction process requires a high operation temperature over 1000 °C, the arrays of stable material selection are extremely limited and operation cost makes it hinder for application. Hence, this talk suggests a way to lower the operation temperature of thermochemical splitting reaction by utilizing reactant gases such as CH₄ and H₂ for reducing oxygen carriers. The reactant of CO₂/H₂O can be effectively converted into CO/H₂ on the reduced oxygen carrier even at 500–850° C.