Comparative analysis of kinetic models for methane steam reforming process over Ni/Al2O3 catalyst – pathway to hydrogen economy

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Continuing decline in technology costs has boomed installation of renewables-based power generation owing to the powerful role played by governments' policies related to energy and climate. As an aftermath of Paris agreement, the necessary transition towards renewable based energy infrastructures entails substantial fluctuations in electricity generation and supply; specifically, with reference to the most developed sources of wind and photovoltaics. These two are heavily weather and climate dependent. Existing technologies like electrolysis, reforming, methanation, liquefaction, on- and off-grid direct network injection and others are all routed through Hydrogen. Production of hydrogen as specialty fuel is the center point of this study under varying operating conditions and feed source compositions using Aspen Plus. This work was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (2018R1A2B6001566) and by Priority Research Centers Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (2014R1A6A1031189).