

Conversion of CO₂ by Gliding Arc Plasma

Antonius Indarto, 이화웅, 최재욱, 송형근*
한국과학기술연구원 청정기술연구센터
(hksong@kist.re.kr*)

Decomposition of carbon dioxide (CO₂) by gliding arc plasma was examined. The gas entered through a nozzle tube from the upstream cylinder reactor and exited at a downstream of the reactor. Some additional gases, such as N₂, O₂, air, and H₂O, have been used to study the effect on CO₂ conversion. A simple kinetic reaction model was made to investigate the pathway of plasma reaction. Experiment results indicate the conversion of pure CO₂ injection reached 18% at the total gas flow rate of 0.85 L/min and produced CO and O₂ as the final products. Proved by the similarity between experimental and simulation result, the conversion reaction was initiated by electron. The existence of excited N₂ level gave a positive effect while O₂ and air produced an opposite effect which might be caused by reverse reaction C and CO to CO₂. The conversion of CO₂ reached 35% at N₂ concentration 95%, higher than pure CO₂ injection conversion which was only 15-18%. Existing water in the plasma reaction decreased the CO₂ conversion and the selectivity of H₂ from water was less than 6%.