

## Conceptual Design and Simulation for the Production of Hydrogen by WGS Reaction in Coal Gasification System

의윤주<sup>1,2</sup>, 성대진<sup>1</sup>, 이상득<sup>1</sup>, 홍석인<sup>2</sup>, 이종민<sup>3</sup>, 문동주<sup>1,\*</sup>  
<sup>1</sup>KIST; <sup>2</sup>고려대학교; <sup>3</sup>KEPRI  
(djmoon@kist.re.kr\*)

One of the most abundant and readily available fuels is the coal and the strong case can be considered as the major world source of clean H<sup>2</sup> energy. There is a need in Coal Gasification systems to integrate complex unit operations including air separation units, gasifiers, gas separation and cleaning units, water gas shift reactors, pressure swing adsorption, to get pure H<sup>2</sup>.

In this work, coal gasification simulation have been done using the most suitable coal, the Drayton, and PRO-II simulation program. It was assumed that the coal was fed by 10 ton/day. The operating conditions were tuning up at 1200~1500°C, 15~30atm and feed molar ratio of C:H<sub>2</sub>O :O<sub>2</sub> = 1 : 0.5~1 : 0.25~0.5. WGS reaction is applied to increase the concentration of hydrogen in the final product. Also, WGS reaction were carried out in catalytic packed-bed reactors. Catalysts can also be used over wider range of temperature and are also tolerant to S-impurities.