

Economical and environmental enhancement by integration of MCFC with desalination processes

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The efficiency of energy intensive desalination processes is increased by combining them with MCFC power generation. Two desalination processes of MED, FO desalination are selected to have synergetic advantages in combination with MCFC. For MED, the hybrid system is proposed to supply steam required for desalination from HRSG heated by exhaust gas from MCFC. The proposed design is evaluated and compared to that of conventional integration with steam turbine. FO desalination also requires heat although it is of the lower temperature and the less than that of thermal desalination processes. In addition to recovering heat in the MCFC exhaust gas to supply heat energy required for draw solution separation in FO desalination, the hybrid system is further refined to capture carbon dioxide in the exhaust gas by modifying the FO process. Consequently, an innovative and environmentally benign system is designed which generates zero NO_x , SO_x , and CO_2 , as well as recovers waste heat in the exhaust gas. The synergetic effects of the proposed hybrid systems are evaluated and the results imply that hybrid system may significantly increase the efficiency and the profitability of desalination processes.