

The study of direct S-CO₂ Power Cycle Operation Characteristics Under the Oxy-fuel-Combustion

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Recently, it is very important to have promising solutions that can maximize power generation efficiency of current power generation processes because there are increasing concerns about the global warming and the depletion of fossil fuels. Since supercritical carbon dioxide (S-CO₂) involves a rapid density change at small temperature and pressure ranges, the S-CO₂ cycle can extract large amounts of energy from relatively small equipment and it is possible to minimize or simplify a power generation block and to obtain higher thermal efficiency than existing steam cycles used in power generation plants. Also, it is one of the future energy conversion technologies that can reduce greenhouse gases by utilizing carbon dioxide. Therefore, S-CO₂ cycles should be practical ways to solve energy and environmental issues, simultaneously. In this study, direct S-CO₂ cycles for oxy-fuel combustion power plants was analyzed by using ASPEN-PLUS. Also, the operating characteristics of direct S-CO₂ cycles were compared with conventional air combustion power plants.