Liquefaction of Carbon Dioxide with Ammonia Absorption Chiller System and its Energy Reduction

Seeyub Yang, Yeong Su Jeong, Chiseob Lee, Seong Pill Cho and Chonghun Han

Seoul National University, Department of Chemical and Biological Engineering, 311dong 415ho Gwanak-ro 1 Gwanak-gu, Seoul,151-744 Republic of Korea

KEPCO E&C, 2354 Younggudaes-ro, Giheung-gu, Yongin-si, Gyeonggi-do, 446-713, Republic of Korea

Abstract
Carbon Capture and Sequestration (CCS) processes are researched throughout the world and considered as a good bridge technology toward low carbon future. Absorption chiller is an energy efficient option for liquefaction of carbon dioxide since it uses heat energy as a source for refrigeration not electrical energy. It is especially efficient when waste heat is abundant like power plants. The carbon dioxide compressor duty to 30 bar is 59.8kWh/tonCO₂. Ternary system of ammonia/water/sodium hydroxide shows better performance than conventional binary absorption chiller system; e.g. low reboiler temperature and duty.

Keywords: CCS; Carbon Dioxide, Absorption Chiller, Sodium Hydroxide

References
A. Alabdulkarem et al, 2012, Development of CO₂ liquefaction cycles for CO₂ sequestration, Applied Thermal Engineering, 144-156