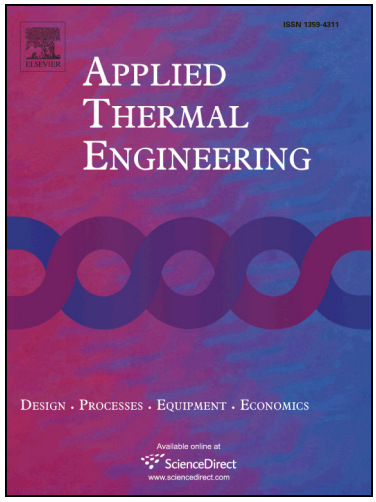

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A technical and economic study on solar-assisted ammonia-based post-combustion CO_2 capture of power plant

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Abstract：

The market of solar-assisted post-combustion CO_2 capture (SPCC) is emerging globally in recent years. It is considered as a promising technology to apply the ammonia as the absorbent to implementing the SPCC technology in view of its low regeneration temperature and low regenerate heat duty. However, few literatures indicate which type of solar thermal collectors (STCs) involved in the ammonia-based SPCC power plant is more applicable. Therefore, in this paper, the maximum theoretical potential price of STCs which make the value of the levelized costs of electricity (LCOE) and the cost of CO_2 removed (COR) lower than that of the reference post-combustion CO_2 capture (PCC) power plant is estimated. The potential of ammonia-based SPCC technology in the selected locations is also estimated, based on the detailed solar radiation resource assessment (i.e. DNI, sunshine time) and the STCs performance. It would be more attractive to adopt the vacuum tube (VT) as the STC involved into the ammonia-based PCC power plant to capture CO_2 than parabolic trough collector (PTC). In order to achieve lower LCOE and COR than that of the reference PCC system, the price of the vacuum tube (VT) has to be reduced to 131.02\$/m^2, 91.76\$/m^2 and 57.10\$/m^2 for the location of