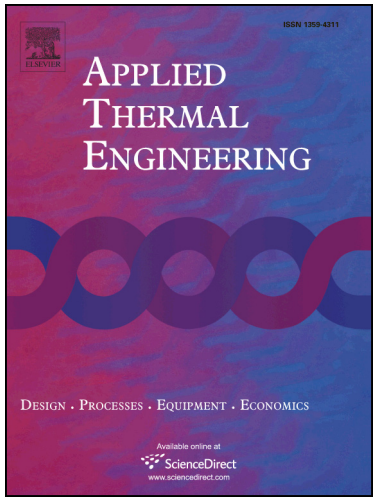

Optimization and energy integration of heat recovery and power generation system

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Abstract

A large quantity of waste gas from industrial processes can be used for steam and power generation. Thus, it is of great interest to define a strategy for these power generation systems to get improved performances and efficiency. Three detailed thermodynamic models of heat recovery and power generation from industrial waste gas specified as single-pessure, dual-preseure, and energy integration systems are presented; Meanwhile, impact factors such as steam parameters, pinch temperature difference, and fluctuation of waste gas source on power generating capacity and total site efficiency are comparable analyzed by adopting a thermodynamic analysis combined with pinch method. Also, a case study of energy integration which doubles the improving effect of power generation accompanied with considerable energy saving is performed on basis of fuel efficiency and exergy calculation. In particular, the hierarchical strategy of energy integration of the total site is proposed and exampled.

Keywords*:* waste heat recovery; power generation; thermodynamic optimization; pinch temperature difference; energy integration