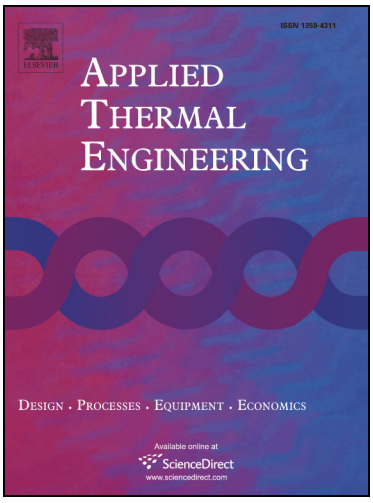

Gas-side fouling, erosion and corrosion of heat exchangers for middle/low temperature waste heat utilization: A review on simulation and experiment

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Gas-side fouling, erosion and corrosion of heat exchangers for middle/low temperature waste heat utilization: A review on simulation and experiment

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Highlights

- Studies on fouling, erosion and corrosion of heat exchangers are summarized.
- Mechanisms and mathematical models of fouling, erosion and corrosion are introduced.
- Fouling, erosion and corrosion characteristics and prediction processes are described.
- Solutions for the problems of fouling, erosion and corrosion are summarized.
- Research needs and prospect of fouling, erosion and corrosion research are discussed.

Abstract: The issues of fouling, erosion and corrosion are commonly occurring phenomena on the flue gas heat exchangers for middle/low temperature waste heat utilization due to the special properties of high ash content, viscous and corrosive components. How to solve these problems effectively has been the subject of many researches in recent years. This paper summarized the development of the simulations and experimental studies for the fouling, erosion and corrosion of heat exchangers. To begin with, the fundamental mechanisms, the prediction models and methods, the simulations with these models and relevant experiments of fouling, erosion and corrosion were introduced. In addition, the prediction processes of the fouling, erosion and corrosion rate were introduced by taking authors' studies as illustrations among them. Finally, it should be noted that for the fouling, erosion and corrosion issues, there are still some key works to be done to better understand the fouling, erosion and corrosion mechanisms, and propose the novel heat exchangers for anti-fouling, anti-erosion and anti-corrosion. It would be desirable that the future heat exchanger designs can overcome the problems, and