

Effects of structural parameters on water film properties of transpiring wall reactor

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Abstract

Reactor corrosion and salt deposition problems severely restrict the industrialization of supercritical water oxidation. Transpiring wall reactor can effectively weaken these two problems through a protective water film formed on its internal surface. In this work, the effects of key structural parameters on water film properties of transpiring wall reactor were explored by numerical simulation, and established models were validated by comparing simulation and experimental values. The results show that transpiration water layer, transpiring wall porosity and inner diameter hardly affected organic matter degradation. Increasing transpiration water layer and transpiring wall porosity reduced reactor center temperatures in the middle and lower zones of the reactor. Increasing transpiration water layer, transpiring wall porosity and inner diameter decreased water film temperatures but increased water film coverage rates. Increasing reactor length affected slightly on the volume of the upper supercritical oxidation zone but enlarged the subcritical zone.

Dear Editor,

We would like to submit the manuscript entitled “**Effects of structural parameters on water film properties of transpiring wall reactor**”, which we wish to be considered for publication in **AICHE Journal**. The work described has not been submitted elsewhere for publication, in whole or in part, and all the authors listed have approved the manuscript that is enclosed. There are no conflicts of interest in our present work.

Copy of the Abstract:

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We believe the manuscript may be interested to the readers of **AICHE Journal**. Thus, we wish to publish this paper in your Journal. Thanks again for your attention to our paper.

Best regards

Sincerely yours,

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