

传递现象

## 电场分布对R123沸腾换热的影响

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摘要

采用6种不同电极布置方式,进行了不同电势和热流密度下的R123池沸腾换热的试验研究。通过数值分析,计算了不同电极布置下换热面上的电场强度及分布。不同的电极布置,会导致换热面上电场强度和电场均匀性两方面的变化。结合试验和电场分布的计算结果,分析了电场均匀性、电场强度、热流密度与沸腾换热效果之间的关系。结果表明,在低热流密度下,电场分布对沸腾换热影响较大;而在高热流密度下,影响较小。电水动力学(EHD)强化换热效果是电场强度和电场均匀性综合作用的结果。

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分类号

## Effects of electric field distribution on R123 boiling heat transfer enhancement

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### Abstract

The effect of six different electrode arrangements on R123 pool boiling heat transfer was investigated. The resultant electric field intensities and distributions on the heat transfer surface were numerically calculated. Both electric field intensity and homogeneity on the heat transfer surface were different for different electrode arrangements. It was found that heat transfer enhancement was related to electric field homogeneity, electric field intensity and heat flux. At a lower heat flux, heat transfer was enhanced more significantly than at a higher heat flux. Meanwhile the higher the electric potential, the more significant the heat transfer enhancement. Electro-hydrodynamics(EHD) boiling heat transfer enhancement was the result of both electric field intensity and homogeneity.

**Key words** [electric field distribution](#) [EHD](#) [heat transfer enhancement](#) [boiling heat transfer](#)

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