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Free convection and vapor diffusion of droplet aqueous solutions

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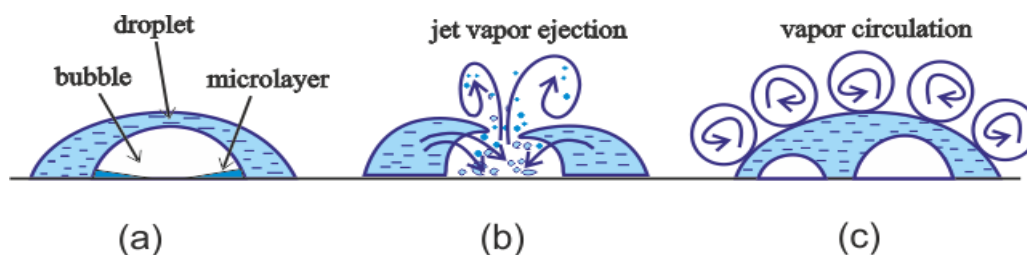
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Graphical abstract



Highlights

- The study concerns the effect of various key factors on the evaporation.
- Vapor-gas convection plays an important role at droplet evaporation.
- The contribution of gas convection changes with an increase in salt concentration.
- At nucleate boiling evaporation is divided into 4 characteristic time sections.

Abstract

Evaporation of drops of water and aqueous solutions of salts LiBr and CaCl₂ have been studied experimentally. The impact of various key factors on the evaporation has been estimated. The behavior of convection significantly differs in drops of water and salt solution. The contribution of gas convection changes with an increase in salt concentration. With increasing salt concentration in a drop, the role of the convective component first increases, reaches an extremum and then decreases with time. Usually when modeling droplet evaporation, the only considered are the diffusive vapor transport and the molecular heat conduction in liquid. The neglect of gas convection in

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