



Physical characteristics of bubbles in dissolved air flotation processes in seawater reverse osmosis desalination plants

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ABSTRACT

In this study, we analyzed the impacts of salinity on the physical characteristics of bubbles in the pretreatment process of seawater desalination facilities to optimize the dissolved air flotation (DAF) process. Bubble size became smaller with increased salinity. Particularly, the difference was marked for relatively large bubbles formed under low pressure and high-molecular weight gases, such as CO₂. We suggest that coalescence decreased at the nozzle because the Laplace pressure decreased with an increase in the repulsive force due to salinity. Bubble bed depth also increased with a reduction in bubble rising velocity because of increased drag force in the water due to salinity. However, there was not a large difference in particle removal efficiency of the lower density bubble bed. Therefore, salinity affects the physical characteristics of bubbles, but does not have a substantial impact on performance, except for DAF processes with high loading rates in which the bubble bed is lower density.

Keywords: Bubble bed; Bubble size; Bubble rising velocity; Coalescence; Pretreatment; Salinity

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