



## Water desalination using R141b gas hydrate formation

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### ABSTRACT

In this paper, water desalination was performed by R141b hydrate formation in systems containing refrigerant and a brine aqueous solution to determine of R141b hydrate growth rate and efficiency of process. Kinetic experiments were conducted with initial temperatures of 0, 2, and 4°C with saline concentrations of 1, 2, 4, and 6% weight of NaCl and also with the molarity 0.304 mol/L of NaCl, KCl, CaCl<sub>2</sub>, and MgCl<sub>2</sub> aqueous solutions. The results show that R141b hydrate formation rate depends on the saline concentration, initial temperature, and salt type. Moreover, the results of water desalination based on R141b hydrate formation indicate that the removal efficiency depends on the ionic size and electrical charge. Each dissolved mineral is removed in following order: K<sup>+1</sup>>Na<sup>+1</sup>>Ca<sup>+2</sup>>Mg<sup>+2</sup> with 59–70% of efficiency.

*Keywords:* R141b; Gas hydrate; Growth rate; Desalination

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