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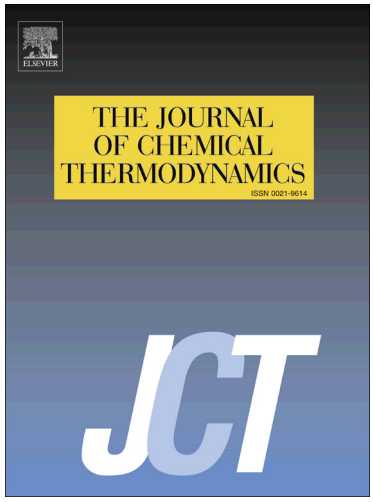

Density and activity of perrhenic acid aqueous solutions at 298.15 K

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Density and activity of perrhenic acid aqueous solutions at 298.15 K

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Published isopiestic molalities for aqueous $HReO_4$ solutions at 298.15 K are completed. Binary data (variation of the osmotic coefficient and activity coefficient of the electrolyte in solution in the water) at 298.15 K for perrhenic acid $HReO_4$ are determined by direct water activity and osmolality measurements. The variation of the osmotic coefficient of this acid in water is represented mathematically according to a model recommended by the National Institute of Standards and Technology and according to the specific interaction theory. The data are also used to evaluate the parameters of the standard three-parameters of Pitzer's ion-interaction model, along with the parameters of Archer's four-parameter extended ion-interaction model, to higher molalities than previously advised. Experimental thermodynamic data are well represented by these models. Density variations at 298.15 K are also established and used to express the activity coefficient values on both the molar and molal concentration scales.

Keywords: perrhenic acid; binary data; activity coefficient; osmotic coefficient; water activity

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