



Discussion

A discussion of the paper “Concentration dependence of diffusion and migration of chloride ions. Part I and Part II” by Luping Tang[☆]

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In Part I of the paper, the author concludes that the “effective” chloride diffusion coefficient is a complex function of the concentration which, for him, depends on four main factors: the counter-electrical potential, the ratio of cation/anion velocity, the “friction” coefficient and the activity coefficient. Could the author please explain the differences between the first two and the last two (“friction” and activity coefficient) ones?

Regarding the first two, in his explanation (p. 1464), the counter field is developed due to the difference in velocity, and therefore, in my opinion, both first factors have similar meaning.

Concerning the last two factors, the “friction” and activity coefficients, it seems to me that Dr. Tang equally repeats the concepts. This is deduced from the definition given by him on the “friction” coefficient (p. 1464) “in a concentrated solution, ions are so close to each other that the friction effect, or interaction, between moving ions should not be ignored”. Thus, the “friction” is

much better figured by the orthodox definition of the activity coefficient.

At this respect, in Part II of the paper, Dr. Tang concludes that “the counter-electrical field has a great influence on the chloride diffusion while the influence of activity coefficient does not appear significant for NaCl and KCl. The friction coefficient f influences both diffusion and migration”. It seems to me contradictory that the “friction coefficient” could influence the movement of the ions, while the classical orthodox activity coefficient does not, in Dr. Tang’s opinion.

Precise definitions are very needed in this subject and, if discrepancy is stated with the well-established classical theory, it has to be extensively argued. Could the author please extend his arguments on why the friction coefficient is better than the classical activity coefficient and, why the counter-electrical field is different from the difference in cation/anion velocity? It will be very much appreciated.

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