

# Preface to the Letters to the Editor

As editor, in this Letters to the Editor section I encourage a free exchange of ideas among authors and readers of the *Journal*. The following two Letters, one by J. Vera referring to an article published in the February 2006 *AIChE Journal* by F. Malatesta and the response, deal with a continuing scientific controversy between them that they are unable to resolve. In the interest of fairness, and to let readers interested in this subject decide for themselves who might be correct, I have decided to publish these Letters to the Editor, though I am concerned about the tone of these communications. So that this argument does not continue endlessly in the *AIChE Journal*, I will not publish further Letters or manuscripts on this subject from these authors until they resolve their difference of opinions.

Stanley I. Sandler  
Editor

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## LETTERS TO THE EDITOR

### To the Editor:

In "On a Recent Purported Determination of Individual Ion Activity Coefficients" (pp. 785-791, Feb. 2006), Malatesta<sup>1</sup> repeats exactly the same arguments he had previously presented<sup>2</sup> against our method<sup>3</sup> to measure ionic activities. Those interested in this discussion are invited to read a complete answer to these arguments,<sup>4</sup> and one additional publication supporting our method.<sup>5</sup> For those who will not refer to the above material, I briefly state our point of view here. In his recent publication, Malatesta<sup>1</sup> reproduces Guggenheim's statement<sup>6</sup> affirming that: "the chemical potential, or the activity of a single ion, and the electrical potential difference between two points in different media are conceptions without any physical significance." After some further considerations, Malatesta<sup>1</sup> concludes that "these arguments taken as a whole are incontrovertible". The answer to this was given by G. N. Lewis and M. Randall<sup>7</sup> who stated that the determination of the actual activity of an ion in a solution of any concentration "indeed might be accomplished if we had

any general method of calculating the potential at a liquid junction." In addition Brönsted et al.,<sup>8</sup> referring directly to Guggenheim's publication,<sup>6</sup> in a free translation, wrote: "Some authors even went further and declared the ionic functions as physically undefined and indefinable; they also declared the general concept of the electric potential as indefinable outside of the purely electrostatic domain. We cannot acknowledge the correctness of such a far-reaching conclusion. We will mainly adhere to the position we previously presented,<sup>9</sup> according to which the chemical potential and the activity coefficient of an ion are as defined as the values for neutral molecules." These quotes clearly show how "incontrovertible" Guggenheim's arguments are.

With respect to the new examples presented by Malatesta<sup>1</sup>, we observe that, as in his previous work,<sup>2</sup> he starts from a definite conclusion, and sets up a thought experiment "with a very simple system" to collect "synthetic data" and demonstrate that his conclusion was right. In fact, instead of using real data, Malatesta<sup>1,2</sup> generates imaginary data with Eq. 7 in <sup>1</sup> Eq. 4 in <sup>2</sup>, which we have shown<sup>4</sup> is not an "exact thermodynamic relation", as claimed. From here on, the whole exercise of Malatesta<sup>1</sup> is unrelated to our method to treat real experimental data.

### Literature Cited

1. Malatesta F. On a recent purported determination of individual ion activity coefficients. *AIChE J.* 2005;52:785-791.
2. Malatesta F. On the Rodil-Vera method for determining ion activities. *Fluid Phase Equilib.* 2005;233:103-109.
3. Wilczek-Vera G, Rodil E, Vera JH. On the activity of ions and the junction potential. Revised values for all data. *AIChE J.* 2004; 50:445-462.
4. Wilczek-Vera G, Vera JH. On the measurement of individual ion activities. *Fluid Phase Equilib.* 2005;236:96-110.
5. Wilczek-Vera G, Rodil E, Vera JH. Towards accurate values of individual ion activities. *Fluid Phase Equilib.* 2006;241:59-69.
6. Guggenheim EA. The conceptions of electrical potential difference between two phases and the individual activity of ions. *J Phys Chem.* 1929;33:842-849.
7. Lewis GN, Randall M. *Thermodynamics*. 1<sup>st</sup> ed. New York: McGraw-Hill; 1923.
8. Brönsted JN, Delbanco A, Volqvartz K. Über die bedeutung des lösungsmittels für die salzen und die aktivitätskoeffizienten der ionen. *Z physik Chemie A* 1932;162:128-146.
9. Brönsted JN. Über acidität und ionen-potentiale. *Z physik Chemie.* 1929;143:301-312.

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