



Bob Eisenberg <bob.eisenberg@gmail.com>

Essential Problem in Classical Physical Chemistry

Bob Eisenberg <bob.eisenberg@gmail.com>

Wed, Jan 29, 2014 at 8:05 AM

Reply-To: bob.eisenberg@gmail.com

To: Troels Ring <tring@gvdnet.dk>, Chun Liu <liu@math.psu.edu>, Tai-Chia Lin 林太家老師 <taichia.lin3@gmail.com>, Yoichiro Mori <ymori@math.umn.edu>, Jinn Liang Liu 劉晉良 <jinnliu@mail.nhcue.edu.tw>, Mark Lundstrom <lundstro@purdue.edu>, Gerhard Klimeck <gekco0@gmail.com>, Jie shen <shen7@purdue.edu>, Fred Cohen <Fredric_Cohen@rush.edu>, Rolf Ryham <rryham@fordham.edu>, Tom DeCoursey <protonophile@gmail.com>, Deri Morgan <Deri_Morgan@rush.edu>, Mike Fill <Michael_Fill@rush.edu>, Bob Eisenberg <beisenbe@rush.edu>

Dear Troels

Here are some slides and papers that show how profound the difficulties are with the classical views of ionic solutions.

Please do NOT discount these because they come from a biologist at an unknown medical school.

These opinions have been refereed by innumerable physical chemists, physicists, and mathematicians, some in the US National Academy, two with the National Medal of Science (harder to get than the Nobel Prize), one with a Wolf Prize, and the views are shared by all physical chemists who know about ionic solutions.

Indeed, physical chemists usually say: what is new?

It turns out that Bjerrum understood the essential issue in the 1920's: **when more than one diameter ion is present the "distance of closest approach" of each type of ion depends on the concentration and diameter of every other ion.**

Any "average distance of closest approach" depends on 'everything' in the system. The "average distance of closest approach" determines a large, usually dominant term in the excess free energy. The excess free energy dominates in the highly crowded environment in and near biological proteins' active sites and nucleic acids.

As ever
Bob

=====

Return Address for email: beisenbe@rush.edu or bob.eisenberg@gmail.com

Bob aka RS Eisenberg
Bard Endowed Professor and Chairman
Dept of Molecular Biophysics & Physiology
Rush Medical Center
1653 West Congress Parkway
Chicago IL 60612 USA
Office Location: Room 1291 of
Jelke Building at 1750 West Harrison

Email: beisenbe@rush.edu
Voice: +312-942-6467

FAX: +312-942-8711

FAX to Email: +801-504-8665

Department WebSite: <http://www.phys.rush.edu/>

Personal WebSite: <http://www.phys.rush.edu/RSEisenberg/>

=====

On Wed, Jan 29, 2014 at 3:20 AM, Troels Ring <tring@gvnet.dk> wrote:

Dear bob - just heard this after hearing your president and thought you might enjoy. Also, while I'm strengthening myself to make the approach you suggested I wonder whether in two words you find my previous attempts totally useless? I know we have to go quite far to get a proper and meaningful picture - but it would be nice to - sort of - know from where to take the first step. As a clinician I would like to start approximately where our current most likely misdirected thinking has brought us. I remember an old saying from Danish philosopher, Søren Kierkegaard - in my translation - "if you really want to help someone move somewhere, you better try to find him where he is and start there" -

All best wishes

Troels

6 attachments



Kirchoff Maxwell Correlations Mass Action.pptx

244K



Crowded Charges USE THIS as Published January 2012 cf arXiv1009.1786v1 .pdf

836K



Faraday Discussions Ionic Interactions 2013 as published in journal.pdf

139K



Interacting Ions BJ May 7 2013 as published.pdf

325K



A Leading Role for Mathematics AS PUBLISHED Siam News Download USE THIS.pdf

178K



Mass Action in Ionic Solutions with cover Use This.pdf

1039K