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Comment

## ***Interactive comment on “Measuring and modeling the hygroscopic growth of two humic substances in mixed aerosol particles of atmospheric relevance” by I. R. Zamora and M. Z. Jacobson***

### **Anonymous Referee #2**

Received and published: 15 March 2013

In this paper the authors present a study on the water activity of mixed systems comprised of humid like substances and various inorganic salts. The study presents some interesting results with regards to the breakdown of additivity assumptions at high concentrations. I recommend publication after the following comments are addressed.

General comments:

- What are the reported accuracies for water activity measurements using bulk methods and how do they compare with levitation techniques?
- Do the authors have any feel for whether any kinetic limitations to mass transfer of water might effect their results? It has been postulated that mixtures of organics may

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form viscous solutions and thus introduce a kinetic barrier for mass transfer.

- Page 1050. Given the wide uptake of Kappa Kohler theory this should at least be briefly mentioned/discussed. Would it be possible to provide an estimate of the associated Kappa values for these mixtures and how would that compare with measured atmospheric behaviour?

- Following the first referee i think it would be highly useful for the community to see how well available mixed inorganic-organic activity models compare with your results. Whilst i understand the difficulty in prescribing functionality to humid like material, it would be at least useful to discuss why this isn't possible.

-The authors report a Vant Hoff factor of 0.28 for the mixture 'NRFA-MIXORG'. As the Vant Hoff factor is used to describe dissociation levels, can the authors describe what effect this might be down to side from the assumptions of molecular weight?

Specific questions:

- Page 1052 Section 2.3 - 'The uncertainty associated with the water activity at 25 °C of pure solutes was reported to be between 0.007 and 0.018 in our previous work'. Over what RH range was this found over?

- How does the reported error in RH compare with other methods such as the EDB?

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Interactive comment on Atmos. Chem. Phys. Discuss., 13, 1045, 2013.

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