

Atmos. Chem. Phys. Discuss., referee comment RC2  
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## Comment on acp-2021-636

Anonymous Referee #2

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Referee comment on "Extension of the AIOMFAC model by iodine and carbonate species: applications for aerosol acidity and cloud droplet activation" by Hang Yin et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-636-RC2>, 2021

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The manuscript by Yin et al. describes the extension of the AIOMFAC model to iodine and carbonate species. These chemical species are important for sea spray and mineral dust particles in the atmosphere. The extension will play a critical role in future thermodynamic studies on coarse mode particles. Generally, the scientific approach of the manuscript sounds. The output of the developed model agrees well with experimental data when it is available. As the authors mention in the manuscript, experimental data for the chemical species are scarce. I hope that the manuscript will stimulate experimental scientists in the area to conduct high-quality study on the related chemical species, and the authors will update the model parameters in the future when it is needed.

The manuscript is well written, and the topic is within the interest of the readers of the journal. I suggest publication of this manuscript after addressing the

Comments

Table 2

It would be more informative if the authors could add further information about the experimental details of the references (e.g., temperature, range of ionic strength, and experimental method).

Table 3

I understand that determination of weighting factors for this type of study needs to be arbitrary. It would be ideal to have a little bit more detailed descriptions on how the weighting factors have been decided.

L372: 'Instead, we estimate the interaction parameters for carbonate ions and organic compounds based on those for sulfate ions due to the similar ion size and electric charge.'

The statement might make sense for the Coulombic force. I wonder if the assumption is valid for middle- and short-range forces.

L438: 'AIOMFAC predictions are substantially lower, by about 0.1 units, than EDB measurements at lower water activity, while they are much better at higher water contents.'

Do the authors have any explanation on this observation?