R1 Response to Reviewer 1

We thank Reviewer 1 for accepting the revised manuscript.

R2 Response to Reviewer 2

We appreciate Reviewer 2 for the comments. Below, we provide point-by-point responses to each comment. In the following text, the **reviewers' comments and suggestions** are in black, **authors' responses** are in red, and **changes to the manuscripts and supplement information** are in blue.

1. line 6: "We selected OS compounds for which the hygroscopic growth factors (HGF) have been experimentally studied." $\longrightarrow$ "The hygroscopic growth factors (HGF) of these OS compounds have been experimentally studied."

   Response: Thank you for pointing it out. We have modified the sentence accordingly.

2. line 19: "but also" $\longrightarrow$ "as well as"?

   Response: We have replaced "but also" with "as well as".

3. line 41-42: ", although requiring much more time for thermodynamic calculations than AIOMFAC" delete? because this has been mentioned in the previous sentence.

   Response: We have removed the sentence in the revised manuscript.

4. line 111: "assume that AS exists in solid-liquid equilibrium before reaching full deliquescence in the calculations." and line 124 "AS is assumed to exist only in its solid form." are they in conflict with each other?

   Response: Thank you for pointing it out. Now, we have corrected the sentence.

   Change:
   [...], we assume that AS exists only in the solid state before reaching full deliquescence in the calculations[...]

5. line 128? please add how you derived the HGF of mixtures when IAP<IAPsat.

   Response: We have included a brief description for the case of IAP<IAPsat.

   Change:
   [...] When the estimated IAP $\leq$ IAP$_{sat}$, AS is assumed to be fully dissolved in the liquid phase and well mixed with OS. Similar to Eq. 7 which treats the particles as a bulk phase, the HGF in this case can be derived based on the COSMO*therm*-estimated α_w of the OS-AS mixture, with the aid of Eq. 10 expressed as below:

$$\mathrm{HGF} = \left(\frac{\frac{m_{\mathrm{OS}}}{\rho_{\mathrm{OS}}} + \frac{m_{\mathrm{AS}}}{\rho_{\mathrm{AS}}} + \frac{m_{\mathrm{H_2O},i}}{\rho_{\mathrm{H_2O}}}}{\frac{m_{\mathrm{OS}}}{\rho_{\mathrm{OS}}} + \frac{m_{\mathrm{AS}}}{\rho_{\mathrm{AS}}} + \frac{m_{\mathrm{H_2O},0}}{\rho_{\mathrm{H_2O}}}} \right)^{\frac{1}{3}} = \left(\frac{1 + \frac{m_{\mathrm{AS}} \cdot \rho_{\mathrm{OS}}}{m_{\mathrm{OS}} \cdot \rho_{\mathrm{AS}}} + \frac{m_{\mathrm{H_2O},i} \cdot \rho_{\mathrm{OS}}}{m_{\mathrm{OS}} \cdot \rho_{\mathrm{H_2O}}}}{1 + \frac{m_{\mathrm{AS}} \cdot \rho_{\mathrm{OS}}}{m_{\mathrm{OS}} \cdot \rho_{\mathrm{AS}}} + \frac{m_{\mathrm{H_2O},0} \cdot \rho_{\mathrm{OS}}}{m_{\mathrm{OS}} \cdot \rho_{\mathrm{H_2O}}}} \right)^{\frac{1}{3}} \quad (1)$$

   where m_{AS} and ρ_{AS} are the mass and density of AS.

6. line 201: "MS"$\longrightarrow$"OS"?

   Response: Thank you for pointing it out. Now we correct the typo.