

Comments:

The authors investigate the influence mechanisms of sulfuric acid and oxygenated organic molecules on particle growth under varying particle sizes and RH conditions using a custom-built scanning flow condensation particle counter (SFCPC) to measure size-resolved hygroscopicity parameters and organic mass fractions in 3–10 nm particles. It further elucidates how the contribution of organic components evolves with particle size, particularly highlighting that increased RH significantly enhances the role of organics in the growth of 5–10 nm particles. This finding holds important value for understanding atmospheric new particle formation and growth mechanisms.

1. The authors treat the α -pinene and SO₂ as the gas precursors, however, the true components participating particle nucleation should be OOM and H₂SO₄, which I guess that you did not measure in the current experiment setup. But still, I am wondering that does the $[\alpha\text{-pinene}]/[\text{SO}_2]$ ratio could represent the ambient atmospheric condition?
2. Table 1 and Line 185: The authors claimed that the observed increase in κ values at higher RH may be attributed to the production of components with stronger hygroscopicity, is there any direct evidence? What is the product in different RH condition and how to explain their influence on hygroscopicity?
3. Figure 5: It seems that the 3–5 nm particles are more affected by RH compared with larger size, why?