Atmospheric Chemistry and Physics Discussions

Atmos. Chem. Phys. Discuss., referee comment RC1
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Comment on acp-2022-262

Anonymous Referee #1

Referee comment on "The effectiveness of the coagulation sink of 3–10□nm atmospheric particles" by Runlong Cai et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2022-262-RC1, 2022

The paper by Cai et al. aims to solve one of the most confusing problems related to particle survival by quantifying coagulation coefficient. Direct experimental evidence for the effectiveness of the CoagS of new particles was provided by well controlled chamber experiments. Comparison between the measured coefficient with theoretical predictions shows that almost every coagulation leads to the scavenging of one particle, and the coagulation sink exceeds the hard-sphere kinetic limit due to van der Waals attractive force. Base on the measurement, the authors proposed high theoretical survival probabilities of new particles in NPF events observed at high coagulation sinks are caused by high growth rates. I suggest the publication of this paper. One issue should be addressed in the abstract "....the measured coagulation coefficient increases significantly with a decreasing particle size...". Please specify for what particle size this conclusion refers to. Obviously, your statement is completely wrong because coagulation coefficient with 10 nm particle decreases with the decreasing size of coagulating particles.