Insights into the role of dicarboxylic acid on CCN activity: implications for surface tension and phase state effects

Chun Xiong, Binyu Kuang, Xiaolei Ding, Xiangyu Pei, Zhengning Xu, Huan Hu*, Zhibin Wang*

1 College of Environmental and Resource Sciences, Zhejiang University, Zhejiang Provincial Key Laboratory of Organic Pollution Process and Control, Hangzhou, China
2 ZJU-Hangzhou Global Scientific and Technological Innovation Center, Hangzhou, China
3 Zhejiang University-University of Illinois at Urbana-Champaign Institute, International Campus, Zhejiang University, Haining 314400, China
4 Key Laboratory of Environment Remediation and Ecological Health, Ministry of Education, Zhejiang University, Hangzhou, China

Correspondence to: Zhibin Wang (wangzhibin@zju.edu.cn) and Huan Hu (huanhu@intl.zju.edu.cn)

Figure S1: Illustration of SFCA calibration measurements performed with AS (for $\Delta T = 4$ K, 6 K, 10 K and 18 K). The slope and intercept of the 4 K line are 0.00034657 and 0.018893; the slope and intercept for the 6 K are 0.00065835 and 0.003186; the slope and intercept for the 10 K are 0.00133500 and 0.060370 and the slope and intercept for the 18 K are 0.00194577 and 0.09362373.
Figure S2: SEM image of a custom-built high aspect ratio (HAR) platinum nanoneedle with constant diameter.

Figure S3: Force (F) plots of bulk surface tension experiment using AFM on (a) 1, 3-propanediol and (b) water, diameter values were obtained roughly from SEM picture of needle. Pink, blue and black lines indicate approaching progress, retracting progress and dwell, respectively. The surface tension of water and 1, 3-propanediol were 73.6 mN m\(^{-1}\) and 48.7 mN m\(^{-1}\), being consistent to results in previous study (Romero and Paéz, 2006). Though SEM picture could obtain rough diameter values, calibration by measuring water surface tension were performed before submicron particles experiments for precise diameter (Kaluarachchi et al., 2021).
Figure S4: RH variation in AFM cell. RH increased from 10% to over 99.5% in around 40 minutes.

Reference