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# Cloud condensation nucleus activity of secondary organic aerosol particles mixed with sulfate

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The cloud condensation nucleus (CCN) activity of organic-sulfate particles was investigated using a steady-state environmental chamber. The organic component consisted of secondary organic aerosol (SOA) generated in the dark from 24 $\pm$ 2 ppb alpha-pinene for conditions of 300 $\pm$ 5 ppb ozone, 40 $\pm$ 2% relative humidity, and 25 $\pm$ 1 C, with the organic mass loading in the chamber ranging from 23 to 37 ug mˆ-3. CCN analysis was performed for 80- to 150-nm particles having variable organic-sulfate volume fractions, which were estimated from the diameter of the organic-sulfate particle relative to that of the seed as well as independently from mass spectra. Critical supersaturation, which increased for greater SOA volume fraction and smaller particle diameter, was well predicted by a Kohler model having two components, one for ammonium sulfate and another for SOA. The entire data set could be successfully modeled by a single suite of effective chemical parameters for SOA. The results suggest that the effects of limited organic solubility in mixed SOA-sulfate particles may be reliably omitted in the treatment of cloud droplet formation.