

## **Hygroscopic growth and cloud condensation nuclei activity of oxalic acid and its inorganic salts**

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Oxalic acid (OxA) is one of the most important and abundant dicarboxylic acids in the atmosphere, being paid a great deal of interest due to its potential impact on cloud condensation nuclei (CCN) activity. Previous studies have been shown that the contribution of OxA to total dicarboxylic acids was more than 50% on average over the urban and marine atmosphere and mineral dust is often enriched with oxalic acid. OxA is likely an end product of photochemical oxidation of many hydrocarbons in water mediated aerosols. Oxalate may form in aerosols if OxA is neutralized by mono- and di-valent cations. Due to the high oxidation state and strong ability to interact with inorganic species, its effects on aerosol chemical composition and microphysical properties are unique and complex, whose uncertainty is large and not well understood. Here, we report the hygroscopic growth and CCN activity of OxA and its inorganic salts using hygroscopicity tandem differential mobility analyzer (HTDMA) and CCN counter with the relative humidity (RH) range of 0 to 92% and supersaturation (SS) of 0.1 to 1.0%, respectively. The initial dry mobility particle diameter was 100 nm. The aerosol generation method involved atomization of aqueous solutions (0.1% wt) using dry filtered air and then passing through the two diffusion silica gel dryers to reduce the RH below 5%. We found that hygroscopic growth factor of ammonium oxalate at 85% RH,  $g(85\%)$  are higher than pure OxA, whereas the hygroscopicities of sodium oxalate, magnesium oxalate and calcium oxalate are lower than pure OxA. Potassium oxalate showed a strong deliquesce around 86% RH. On the other hand, sodium oxalate, potassium oxalate and ammonium oxalate showed strong CCN activation ability. Calcium oxalate showed moderate ability whereas magnesium oxalate showed poor CCN activation ability.