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Ammonia uptake by organic aerosols and its effect on their water uptake properties

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Atmospheric aerosols play an important role in cloud microphysics by acting as cloud condensation nuclei (CCN). Understanding and predicting aerosol particles' influence on cloud microphysics and its effect upon local and global climatic changes requires knowledge of their hygroscopic properties, which are a result of the chemical nature of the aerosol components. Until recently most attention was directed towards studying how inorganics and organics species can influences aerosols cloud interactions. However, new evidence suggests that coupling between inorganic and organic chemistry in atmospheric aerosols can occur, mainly by the formation of organic ammonium salts. It was recently found that the observed CCN activity of biomass burning aerosols can be explained only if organic acids present in the aerosol are present in the form of ammonium salts (*Mircea, et al*., 2005; *Falkovich, et al*., 2005). Moreover, new evidence shows that near livestock farms, ammonia plays a significant role in the formation of secondary organic aerosols that can act as CCN (*Lammel, et al*., 2004). In the present study we present evidence that gas phase ammonia can interact with aerosols containing atmospherically relevant organic compounds such as adipic acid, glutaric acid, suberic acid, humic substances and humic like substances (HULIS) extracted from collected atmospheric particles. The reactive uptake of ammonia by these organic aerosols result in a dramatic decrease in their diameter of activation (D50) to cloud droplets, thereby making them better CCN. We will discuss a mechanism by which ammonia acts as a non-destroying reactant which may be recycled to react again.