**1PD3**

ION-INDUCED NUCLEATION: DIPOLE-CHARGE ORIENTATION, SIGN PREFERENCE AND CHEMISTRY EFFECT. ALEXEY NADYKTO, Fangqun Yu, Atmospheric Sciences Research Center, State University of New York at Albany, Albany, USA

We investigate the uptake of common precursors by ion clusters using seven different approaches including Nadykto-Yu model (NY), effective polarizability model (EP), Barker-Ridge (BR) model, the average dipole orientation theory (ADO), the angular momentum conservation ADO (AADO), refined ADO theory (ADO`), and refined AADO theory (AADO'). We found that the enhancement factor due to the dipole-charge interaction predicted by different uptake/capture models can deviate by a factor of more than 5. At ambient temperature of 300 K the enhancement factor for the uptake of water, sulfuric acid and ammonia molecules by 0.5 nm singly charged molecular cluster is in the range of 2.3–12, 2.5–20 and 1.75–9.8 respectively. In addition to the uncertainties in absolute values of the enhancement factor, there is a considerable difference in its temperature dependence. The temperature dependence of EP, and ADO is typically weaker than that of the other theories. BR, ADO', AADO' and NY, which are derived using different capture/uptake conditions and similar dipole orientation models, are in quite a good agreement in most cases, while ADO and ADO' and AADO and AADO' models obtained using identical capture/uptake conditions and different orientation models deviate dramatically. Present analysis shows that uncertainties in the enhancement factor are largely arise from the difference in how the relative dipole orientation of the polar molecule in an ion field is expressed. This means that the average dipole orientation in the ion field is an important parameter controlling gas-to-charged particle/cluster conversion and needs to be investigated further.

**1PD4**

THE EFFECT OF DILUTION ON ORGANIC COMPOSITION OF DIESEL PARTICULATE MATTER (DPM). Fuyan Liang, MINGMING LU, Tim. C. Keener, Zifei Liu, University of Cincinnati, Cincinnati, OH

In current decades, there has been a growing interest in quantifying and reducing the amount of diesel particulate emissions from non-road diesel powered engines. Studies have indicated that diesel particulate matter (DPM) can be hazardous to human health since DPM is mainly in the respirable range (< 1 μm) and many organic species in DPM, such as polycyclic aromatic hydrocarbons (PAHs) and alkylated PAHs, are considered as potential occupational carcinogens.

DPM concentration and composition are significantly affected by dilution factors due to the condensation of some organic compounds which constitute approximately 20%-60% of DPM. In order to provide more accuracy in addressing health risks associated with DPM exposure, it is important to be able to individual species in the organic compounds. High volume sampling with dilution is often required to collect sufficient mass for the above purpose. The comparison of DPM composition under dilution conditions and non-dilution conditions will help to understand the condensation mechanism of different kinds of organic compounds in DPM, as well as to estimate the actual concentration and components of DPM in ambient air.

The main objective of this study is to investigate the effects of dilution factors on the distribution of organic species in DPM. The study was performed on a Generac diesel generator which serves as a DPM emission source. High volume sampling system (for source influenced atmospheres or with dilution for source) and EPA method 5 sampling train (Determination of Particulate Matter Emissions from Stationary Sources) were used to collect DPM. DPM mass concentrations, organic carbon and elemental carbon (OC/EC), and organic compositions were compared for dilution, source and ambient samples. DPM mass concentration was gravimetrically measured. The distributions of OC and EC loadings on the filters were determined by NIOSH Method 5040, a thermal-optical (transmission) method commonly used in OC/EC measurements. The organic compounds were identified and quantified with GC/MS and classified as n-alkanes, branched alkanes, cycloalkanes, PAHs and alkylated PAHs, alkylbenzenes, and organic acids.