Atmos. Chem. Phys. Discuss., 8, S10235–S10237, 2009
www.atmos-chem-phys-discuss.net/8/S10235/2009/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Observation of nitrate coatings on atmospheric mineral dust particles" *by* W. J. Li and L. Y. Shao

Anonymous Referee #1

Received and published: 6 January 2009

This paper reports on the results of the TEM/EDX single-particle analysis of mineral dust particles collected during haze and brown dust episodes in Beijing. Different types of particles have been accounted, presented and discussed. The analysis is focused to study in detail groups of particles with soluble nitrate coatings that may alter hygroscopic properties of particles. Presented data reveals a number particle types in the samples exhibiting typical nitrate coatings that support previous laboratory and field studies. In general, the subject of the manuscript and type of the data presented in the manuscript merit publication in ACP. However, the manuscript in its current form suffers from a number of technical and structural problems that need to be addressed before publication. My specific comments are summarized below:

Major issues:

1. As indicated by both other reviews, clear presentation of particle statistics in each of the samples is needed. I also second the comments that authors need to present the general differences and/or similarities in major types of original (uncoated) mineral dust particles arriving from northwest (dust episode) and southeast (haze episode).

2. It needs to be clearly indicated that analysis of C, N, O is semi-quantitative at best. The Ca/N/O ratios measured in this work and presented in the ternary diagram of Fig 6 are not necessarily comparable with the “reference areas” described by Laskin et al, 2005b (JGR, 110, D10208). Those areas were determined experimentally using laboratory prepared particles of CaCO3 and Ca(NO3)2 and applicable for the specific settings of the SEM instrument used in that study. For the purpose of the presented manuscript, the “reference areas” need to be identified using the same instrument and beam settings applied for the reported particle analysis.

3. Figure 1 and its caption. On the map I see 7 “blue” trajectories which have no legends on them. On the other hand, I see 9 “blue” records on the RH panel of the figure. How are they related? Also, it might be useful to present height records of the corresponding air plumes

4. Text of the manuscript requires extensive editing to improve the language. I strongly recommend to the authors to seek help of a professional editor.

Minor issues:

5. EDS stands for Energy Dispersive Spectrometer/Spectrometry which therefore sounds awkward when used as “EDS analysis”. More correct form would be “EDX analysis” which is “Energy Dispersive X-ray analysis” I suggest changing “EDS analysis” by “EDX analysis” through the manuscript.

6. Both, in the abstract and in the introduction authors state particle composition was analyzed using TEM which is not entirely correct. Use of EDX and SAED needs to be

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8, S10235–S10237, 2009

Interactive Comment

noted.

7. I suggest adding internal grid for the ternary diagram of Fig 6 to make it more readable.

8. page 19252, lines 3-4: references of DeMott et al and Knopf and Koop do not report on CCN activity of mineral dust particles, but rather on their ice nucleation (IN) ability.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 19249, 2008.