Atmos. Chem. Phys. Discuss., 8, S10012–S10014, 2008
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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 #2

Received and published: 19 December 2008

GENERAL VIEW

This paper provides interesting results on the composition of coatings on dust particles during brown haze and dust episodes in Beijing, northern China. In my opinion, there is no strikingly new information or scientific originality in this study. On the other hand, the work supports the results of the earlier works and the paper is clearly written and well referenced. Thus, the work would merit publication in ACP after few major/minor and some minor revisions mentioned below.

MAJOR COMMENTS

In my opinion, it would be very important to show the major core types (e.g. table rows: Si-rich=quartz, Si-Al-rich=aluminosilicates such as clays and feldspars or hornblende,

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Ca/Mg-rich=dolomite, Ca-rich=calcite, Fe-rich=hematite) and the major coating types (table columns: Ca-rich, Mg-rich, Na-rich, K-rich and S-rich) at a new table. That kind of table would give an interesting and clear general view on the association between core and coating types. The values at the table could be given in percent but it would be necessary to mention the total number of particles analyzed, as was also mentioned in F. Dulac's comments. How many particles were analyzed from each sample?

The other comments from F. Dulac were also important, and I hope that they are considered carefully. If the number of particles is quite low (e.g. 300-500 particles), it might be reasonable to show it even in the abstract.

It would be necessary to mention that analysis on nitrogen is very difficult with EDS and that semivolatile compounds are lost in conventional electron microscopy. For instance, Fig. 4 demonstrates that peaks for N are very low in the EDX spectra. Is it possible to reliably compare elemental results between this work and Laskin et al (2005) in Fig. 6? The elemental ratios might be different due to analytical differences (differences in the sensitivity of EDS, accelerating voltage, vacuum strength, the coating material of TEM grids). At least it would be very important to mention that the elemental results are semiquantitative, especially for light elements. Is it possible to reliably analyse N content difference between the cores and coatings for Ca-rich and Ca/Mg-rich particles because those cores might (potentially) also contain N? Could it be possible that some of those cores have also been in liquid form during transport if RH has been high, and therefore, the whole particle have been subject to the substitution of carbonate by nitrate or sulphate?

MINOR COMMENTS AND TECHNICAL CORRECTIONS

The language could be checked by a native English-speaking person.

Page 19251, rows 7-10: This sentence is too long and unclear. It would be reasonable to separate it into two parts. "Fresh mineral dust particles in the troposphere are far more inert than chlorides, sulfates, and nitrates. When aged by soluble aerosol compo-

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nents, mineral dust particles will have enhanced their hygroscopicity and altered their sizes and shapes (Krueger et al., 2003; Krueger et al., 2004; Laskin et al., 2005b)."

Page 19251, row 17: The year is missing from Krueger et al.

Page 19252, row 11: Semi-colon is missing between Johnson and Niemi.

Section 2.2: It would be good to add short description of the sampling site (urban background or traffic site, height above sea level?).

Page 19253, row 25. It would be good to mention that ELEMENTAL compositions were determined with EDS.

Section 3.2. The current structure of the section was a bit unclear during first reading. The clarity could be increased by adding the names of each coating types at the beginning of each paragraph. The names of the coating types could be underlined.

Fig. 1. Where the RH was measured? Are these modelled results from transport routes or local measurements during sampling day?

Fig. 4. It would be nice to show the spectra at the same order as they are described in the section 3.2.

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

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Interactive Comment