Atmos. Chem. Phys. Discuss., 7, S9124–S9125, 2008
www.atmos-chem-phys-discuss.net/7/S9124/2008/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Extinction efficiencies of coated absorbing aerosols measured by cavity ring down aerosol spectrometry" *by* A. A. Riziq et al.

A. A. Riziq et al.

Received and published: 5 February 2008

Response for comments by referee #2:

We thank the reviewer for the thoughtful comments which we hope will improve the our paper. Below we detail our response the comments.

1) As for asking for calculations for loss of coating due to heating by absorption of the laser light: due to the very small light intensity in the cavity, this effect is not substantial. The entire intensity going into the cavity is between 1 to 5 mJ/pulse. Out of this initial energy, 99.995% is reflected back at the front mirror. Therefore, 0.001-0.005 mJ/pulse encounter the particles. This energy is too low for heating and evaporating. Another point – such loss should have been observed in all coating thicknesses and be

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

more significant in the smaller sizes. This is contrary to what is actually observed.

2) The referee raises that inability to be more definite in our conclusions in determining the reason for the relatively large error (less than 10%) between the measured and calculated extinction efficiency (Qext) of thick coatings as a major weakness in this paper. We feel that we have discussed all possible sources of error that would cause this disagreement. In some case we were also able to improve our calculations taking into our account corrections for inhomogeneous coatings and non-concentric coatings and as the referee mentioned these corrections reduce the error. Another point that was raised by the first referee which can also explain this error is the contribution of the size distribution to various core + shell. This contribution is not easy to estimate as we mentioned that in our response to the first referee. Indeed, we cannot determine whether the error is a result of limitation of the Mie theory to predict the extinction efficiency (Qext) for large coating or as a result of instrumental limitation. However, for atmospheric-relevant thin coatings we demonstrate that the effect of coating on extinction efficiency (Qext) can be accounted successfully by the Mie theory. We are also carrying experiments in which different possible core + shell are used in order to understand whether this error is repeated. For example, we are preparing samples of non-absorbing – non-absorbing, non-absorbing – absorbing core + shell. These experiments would help us to be more definite in determining the source of error for large coatings.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 18113, 2007.

ACPD

7, S9124–S9125, 2008

Interactive Comment