Sensitivity of aerosol refractive index retrievals using optical spectroscopy: Supplemental Information

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Scatter and box and whisker plots for the three mildly absorbing systems for runs where the weighting of the merit function was the measured cross section, 10% of the measured cross section, and 5% of the measured cross section for CRD (Figure S1) and CRD+PAS (Figure S2). Also shown are scatter and box and whisker plots for the three mildly absorbing systems where the uncertainty in the charge fraction was set to zero for a CRD-only retrieval (Figure S3), plots for a CRD+PAS retrieval with a 20% error in the absorption measurement (Figure S4), and plots for runs with the strongly absorbing systems where the uncertainty in the charge fraction was set to zero (Figure S5). Finally the percent differences in extinction and absorption cross sections due to changes in the real part of the refractive index are shown in Figure S6.

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Figure S1: *Effect of different weights on the fitting when using CRD data. Results when using the measured cross section (a-d), 10% of the measured cross section (e-h), or 5% of the measured cross section (i-l) as the weight.*

Figure S2: *Effect of different weights on the fitting when using CRD+PAS data. Results when using the measured cross section (a-d), 10% of the measured cross section (e-h), or 5% of the measured cross section (i-l) as the weight.*

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Figure S3: Effect of removing doubly charged particles. (a) Scatter plot of retrieved n and k values of BrC using CRD and twelve diameters. The gray circle denotes the true value. (b-d) Box and whisker plots for RI values retrieved using the different diameter sets for BrC, AS, and Titan. The dashed lines denote the true value.

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Figure S4: *Effect of increasing the error in the absorption to 20%. (a) Scatter plot of retrieved n and k values of BrC using CRD+PAS and twelve diameters. The gray circle denotes the true value. (b-d) Box and whisker plots for RI values retrieved using the different diameter sets for BrC, AS, and Titan. The dashed lines denote the true value.*

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Figure S5: *Effect of removing doubly charged particles for the strongly absorbing compounds. (a) Scatter plot of retrieved n and k values of BrC using CRD and twelve diameters. The true value is marked with the gray circle. (b-d) Box and whisker plots for RI values retrieved using the different diameter sets for BrC, AS, and Titan. The dashed lines denote the true value.*

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Figure S6: Effect of changing the real part of the refractive index on the extinction (solid lines) and absorption (dashed lines) cross section. Since n is always greater than 1 and since $n - 1$ is usually several times greater than k , n was changed by $\pm 5\%$ in addition to $\pm 10\%$ and $\pm 20\%$.