Supplement of

Emission characteristics of refractory black carbon aerosols from fresh biomass burning: a perspective from laboratory experiments

Xiaole Pan et al.

Correspondence to: Xiaole Pan (panxiaole@mail.iap.ac.cn)

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Figure. S1 The mass of FS particles and effective density as a function of is mobility diameter. The Effective density of FS particles was measured using a DMA-APM-CPC system.
Figure S2. Detection efficiency of SP2 as a function of mass equivalent diameter of rBC particle at 80 nm ~ 190 nm. The y-axis represents the count ratio between SP2 and CPC3010 measurements.

Figure S3. Scatter plot and linear regression of LEO_fitting Shell diameter of coated rBC and its Mobility diameter determined by Tandem DMA-SP2 system.

\[ y = 0.6194x + 79.263 \]

\[ R^2 = 0.898 \]
Figure S4. Normalized number size distribution and volume size distribution (presuming refractive index of $m = 1.5 - 0i$ and spherical configuration of non-rBC particles) for all the data of burning experiments. For better view, the distributions were normalized to maximum value $= 1$. A lognormal function fitting was applied to the volume size distribution.

Figure S5. Histogram of coating thickness of rBC particles with MED $= 200 \pm 10$ nm and MED $= 250 \pm 10$ nm. A lognormal fitting was applied to the rBC particles with MED $= 200 \pm 10$ nm, and a Gaussian fitting was applied to the rBC particles with 250 $\pm 10$ nm.