



Supplement of

Scattering and absorption cross sections of atmospheric gases in the ultraviolet– visible wavelength range (307–725 nm)

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18 19 Figure S1. Performance of the BBCES system. (a) Cavity transmission spectra of N₂ at 1015 hPa

20 and 295.65K. (b) Mirror reflectivity measured using N2 and He as references. (c) The vacuum

21 effective optical pathlength of the cavities.

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Figure S2: Validation of the CRD systems (404 nm left, 662 nm right). The measured light intensity (a,c) decay in a nitrogen-filled cavity fitted to an exponential decay (solid orange line) with time constant $\tau_{0-404} = 29.0 \mu$ sec and $\tau_{0-662} = 162.9 \mu$ sec up to 5 e-folding times of τ_0 . The

27 residuals (b, d) show no apparent structure from other time constants, indicating the decays follow

a single exponential.

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Figure S4. The relative difference of the Rayleigh scattering cross-sections calculated by the 34 refractive index derived in this study and from literature.



35 36 Figure S5. Refractive index fit using our raw BBCES data and averaged data for SF₆.



Figure S6. Refractive index fit using our raw BBCES data and averaged data for N₂O.

37 38 39



40 Wavelength (nm) 41 Figure S7. Refractive index fit using our raw BBCES data and averaged data for CH₄.