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A Broadband Cavity-Enhanced Absorption Spectrometer for Simultaneous measurements of NO2 and particulate matter

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A novel instrument based on broadband cavity enhanced absorption spectroscopy has been developed using a supercontinuum broadband light source, which showcases its ability in simultaneous measurements of the concentration of NO_2 and the extinction of particulate matter (PM). Side-by-side intercomparison was carried out with the reference NOx analyzer for NO_2 and OPC-N2 particle counter for particulate matter, which shows a good linear correlation with $r^2 >$ 0.90. Measurement limits (1σ) of the developed instrument were experimentally determined to be 230 pptv in 40 s for NO_2 and 1.24 Mm^{-1} for the PM extinction in 15 s, respectively.

This work provides a promising method in simultaneously monitoring atmospheric gaseous compounds and particulate matter, which would further advance our understanding on gas-particle heterogeneous interactions in the context of climate change and air quality.

Experimental details and the preliminary results will be discussed and presented.

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