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In situ monitoring of NO_3 in an atmospheric simulation chamber

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A broadband cavity-enhanced absorption spectroscopy (BBCEAS) system has been developed to detect the nitrate radical, NO_3, in a 4 m atmospheric simulation chamber. The BBCEAS system shows excellent sensitivity to the strong 662 nm $B^2E' \leftarrow X^2A^{2'}$ (0,0) absorption band of NO_3. The time resolution of the system is excellent and simultaneous detection of several gases is possible, making the method ideally suited to kinetics studies under representative atmospheric conditions. Results are presented based for the important atmospheric reaction $NO_2 + O_3 \rightarrow NO_3 + O_2$. We discuss instrument calibration, spectral analysis, and the sensitivity of the system.