Trace Gases: Monitoring and Controlling CO2 and other Trace Gases in Controlled Environment Systems. (Z08-allen150241-Oral)

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Abstract:

Controlled environment systems are essential for investigating plant responses to environmental factors such as temperature, humidity, and biological gases, especially carbon dioxide (CO2). Measuring and controlling CO2 is required for all types of controlled environment systems, especially if the system is also used to measure net photosynthetic or dark respiration CO2 exchange rates. Since ozone (O3) adversely affects plants, specialized studies require systems to inject, measure and control this gas. Methane (CH4) is emitted from plants growing in anaerobic soil or water, and measurement, but not necessarily control, is needed for studies involving anaerobic compartments. Inert gases such as nitrous oxide (N2O) have sometimes been employed to independently measure chamber leakage rates for correcting CO2 exchange rates. This paper will focus on sensors and techniques that have been developed to monotor and control trace gases in both closed-cycle and open controlled environment systems.

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