AirMonTech

Air Pollution Monitoring Technologies for Urban Areas

Overview of Measurement Technologies for Air Pollutants and Air Quality Metrics

Pollutant Type: Gaseous Pollutant
Pollutant/Metric Name: Carbon Monoxide (CO)

#	Technology	Characteristics and performance	Availability and current use of instruments	Suggested area of application
1	Non-dispersive Infrared Absorption (NDIR)	– European reference method (EN14626; 2005). – Robust instruments available from various manufacturers. Widely used in monitoring networks. – Different designs of this measurement technology (e.g. dual-cell instruments, gas filter correlation instruments). – Attention has to be paid to interference to other infrared radiation absorbing gases such as water vapor, carbon dioxide, nitrous oxide and hydrocarbons. – Typical precision of NdIR instruments is around 15 ppb, see [1], [2].	Commercial; monitoring networks	Urban, rural
2	Fourier Transform Infrared Spectroscopy (FTIR)	– Closed path instruments available [3]. – Highly sensitive and selective, typical precision better than 2ppb.	Commercial; monitoring networks (remote sites); research	Remote
3	Infrared Laser Spectroscopy (TDLS, QCLAS)	– Highly sensitive and selective, typical precision better than 2ppb [4].	Commercial; research	Remote
4	Cavity Ringdown Spectroscopy (CRDS)	– Highly sensitive and selective, typical precision better than 2ppb [4]. – Robust instruments suitable for long-term operation.	Commercial; monitoring networks; research	Urban, rural, remote
5	Gas chromatography	– Gas chromatographic separation with a mercuric oxide reduction detector (GC/HgO) or gas chromatographic separation followed by reduction on a nickel catalyst and analysis by a flame ionization detector (GC/FID).	Commercial; monitoring networks (remote sites); research	Remote
6	Vacuum UV Resonance	– Until recently best available technique for high precision measurements at remote	Commercial; moni-	Remote

	Fluorescence (VURF)		sites [1] , [2], and [4].	toring networks (remote sites); research	
7	Low-cost sensor Technology	–	Electrochemical as well as NDIR-Sensors available. Performance and specifications currently not well characterized.	Commercial; Research	Urban Personal Monitoring

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References:

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[3] Griffith, D. W. T., N. M. Deutscher, C. G. R. Caldow, G. Kettlewell, M. Riggenbach and S. Hammer (2012). A Fourier transform infrared trace gas analyser for atmospheric applications. Atmos. Meas. Tech. Discuss. 5(3): 3717-3769.
[4] Zellweger, C., M. Steinbacher and B. Buchmann (2012). Evaluation of three new laser spectrometer techniques for in-situ carbon monoxide measurements. Atmos. Meas. Tech. Discuss. 5(4): 4735-4769.