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Stratospheric Ozone Detection Using a Photon Stimulated Ozone Sensor Based on Indium Oxide Nanoparticles

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ABSTRACT

Stratospheric ozone is normally measured using stationary equipments, such as a Dobson spectrometer and filter ozonometer, which have the disadvantages of large size, high price and high cost for operation and maintenance. In this work, a balloon-borne photostimulated ozone sensor based on indium oxide nanoparticles has been developed to measure stratospheric ozone. Using the remote compact energy-saving room-temperature ozone sensor, a vertical distribution of ozone concentration with a high resolution was obtained, and the ozone concentration at ~ 27 km over sea level between Lake Constance, Germany and Lake Zurich, Switzerland was determined to be ~ 5.6 ppm.

KEYWORDS

Stratospheric Ozone, Photon Stimulation, Indium Oxide Nanoparticles

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References

- [1] [1] R. C. Smith and K. S. Baker, " Stratospheric Ozone, Middle Ultraviolet-Radiation, and C-14 Measurements of Marine Productivity," *Science*, Vol. 208, No. 4444, 1980, pp. 592-593. doi:10.1126/science.208.4444.592
- [2] R. Stolarski, R. Bojkov, L. Bishop, C. Zerefos, J. Staehelin and J. Zawodny, " Measured Trends in Stratospheric Ozone," *Science*, Vol. 256, No. 5055, 1992, pp. 342-349. doi:10.1126/science.256.5055.342
- [3] R. D. McPeters and S. M. Hollandsworth, " Trends in global ozone as of 1995," *International Journal of Environmental Studies*, Vol. 51, No. 3, 1996, pp. 165-182. doi:10.1080/00207239608711079
- [4] H. V?mel and K. Diaz, " Ozone Sonde Cell Current Measurements and Implications for Observations of Near-Zero Ozone Concentrations in the Tropical Upper Troposphere," *Atmospheric Measurement Techniques*, Vol. 3, No. 2, 2010, pp. 495-505. doi:10.5194/amt-3-495-2010
- [5] H. Nakagawa, S. Okazaki, S. Asakura, H. Shimizu and I. Iwamoto, " A New Ozone Sensor for an Ozone Generator," *Sensors and Actuators B-Chemical*, Vol. 77, No. 1-2, 2001, pp. 543-547. doi:10.1016/S0925-4005(01)00696-7
- [6] C. Y. Wang, V. Cimalla, T. Kups, C. C. R?hlig, T. Stau- den, O. Ambacher, M. Kunzer, T. Passow, W. Schirmacher, W. Pletschen, K. K?hler and J. Wagner, " Integration of In2O3 Nanoparticle Based Ozone Sensors with GaInN/GaN Light Emitting Diodes," *Applied Physics Letters*, Vol. 91, No. 10, 2007, pp. 103509. doi:10.1063/1.2779971
- [7] K. K?hler, T. Stephan, A. Perona, J. Wiegert, M. Maier, M. Kunzer and J. Wagner, " Control of the Mg Doping Profile in III-N Light-Emitting Diodes and Its Effect on the Electroluminescence Efficiency," *Journal of Applied Physics*, Vol. 97, No. 10, 2005, pp. 104914-104918. doi:10.1063/1.1901836

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- [8] C. Y. Wang, V. Cimalla, H. Romanus, T. Kups, M. Niebelschutz and O. Ambacher, " Tuning of Electrical and Structural Properties of Indium Oxide Films Grown by Metal Organic Chemical Vapor Deposition," *Thin Solid Films*, Vol. 515, No. 16, 2007, pp. 6611-6614. doi:10.1016/j.tsf.2006.11.079
- [9] C. Y. Wang, V. Cimalla, T. Kups, C. C. Rohlig, H. Romanus, V. Lebedev, J. Pezoldt, T. Stauden and O. Ambacher, " Photoreduction and Oxidation Behavior of In₂O₃ Nanoparticles by Metal Organic Chemical Vapor Deposition," *Journal of Applied Physics*, Vol. 102, No. 4, 2007, pp. 044310-044316. doi:10.1063/1.2770831
- [10] D. Kley, P. J. Crutzen, H. G. J. Smit, H. Vomel, S. J. Oltmans, H. Grassl and V. Ramanathan,