Stephen So et al., J Phys Chem Biophys 2014, 4:5
http://dx.doi.org/10.4172/2161-0398.S1.006

OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference and Exhibition on
Lasers, Optics & Photonics
September 08-10, 2014 Hilton Philadelphia Airport, USA

Mid-infrared semiconductor laser based trace gas analyzers: Advances, applications and future outlook

Stephen So[1], **Frank K Tittel**[2], **Wei Ren**[2], **Wenzhe Jiang**[2], **Yingchun Cao**[2], **Dongfang Jiang**[2], **Vincenzo Spangnolo**[3] and **Pietro Patimisco**[3]
[1]Sentinel Photonic, USA
[2]Rice University, USA
[3]University of Bari, Italy

This talk will focus on recent advances in the development of trace gas sensor technologies, based on infrared semiconductor lasers for the detection, quantification and monitoring of trace gas species and their application in atmospheric chemistry, medical diagnostics, life sciences, industrial process control as well as security and defense. The development of compact trace gas sensors, in particular based on quantum cascade and interband cascade lasers which permit the targeting of strong fundamental rotational-vibrational transitions in the mid-infrared and that are one to two orders of magnitude more intense than overtone transitions in the near infrared. Specifically, the spectroscopic detection and monitoring of six molecular species, such as ammonia (NH_3), nitric oxide (NO), carbon monoxide (CO), sulfur dioxide (SO_2), methane (CH_4), nitrous oxide (N_2O) and hydrogen peroxide (H_2O_2) will be described. These molecules were detected using conventional photoacoustic and quartz-enhanced photoacoustic spectroscopy (PAS & QEPAS). PAS and QEPAS can achieve minimum detectable absorption losses in the range from 10^{-8} to 10^{-11} $cm^{-1}/\sqrt{Hz}$. Several recent examples of real world applications of field deployable gas sensors and future developments will be described.

Biography

Stephen So received the PhD degree at Rice University in 2008. He was a Postdoctoral Research Fellow from 2008-2011 at Princeton University and was supported by an NIH NIEHS (National Institute for Environmental Health Science) Ruth L Kirchstein Post-Doctoral Fellowship. He was previously affiliated with the Rice University Laser Science Group led by Prof. Frank Tittel, supported by a Nettie S. Autrey Fellowship. He has authored/coauthored 13 papers and has given numerous presentations at major international scientific conferences. He founded Sentinel Photonics in 2011, a startup company in Princeton, New Jersey focused on research and development towards commercializing ultra-compact laser-based trace gas sensors.

sso@sentinelphotonics.com