Recent advancement on quartz tuning fork based-spectroscopy for real world applications

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Gas detection is assuming a crucial role in many real-world applications, such as environmental monitoring, industrial process control, petrochemical industry, safety and security, and biomedicine. Among optical techniques, Quartz-Enhanced Photoacoustic Spectroscopy (QEPAS) has been demonstrated to be a leading-edge technology for addressing the above application requirements, providing also modularity, ruggedness, portability and allowing the use of extremely small volumes. QEPAS technique does not require an optical detector, it is wavelength independent, it is immune to environmental noise and can operate in a wide range of temperature and pressure [1-2]. Starting from the main principles governing the Quartz tuning fork (QTF) physics, I will review the latest results achieved by exploiting custom QTFs focusing on real-world applications, like CO detection in urban environment [3], hydrocarbon detection in natural gas [4], methane detection in landfill [5] and a box size sensor for detection of NH3, CO2 and N2O for agriculture applications.

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