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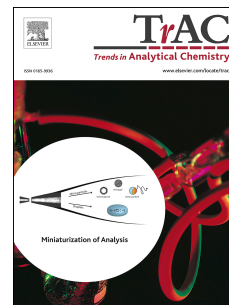
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Fiber Enhanced Raman Gas Spectroscopy

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Abstract

Fiber enhanced Raman spectroscopy (FERS) is a powerful multigas analysis technique. It combines the unmatched analytical prowess of Raman spectroscopy with the enhancement of small signals through the sophisticated use of hollow core optical fibers. Consequently, FERS is highly selective and very sensitive and as an optical technique label-free, non-invasive, and fast. Hollow core photonic crystal fibers and metal coated capillaries provide enhancement based on the confinement of guided light and gas. The technique allows the unambiguous identification and quantification of various gas mixture components, including hydrogen and nitrogen. The resulting versatility opens a broad range of applications for FERS. Several examples of medical gas sensing are reported. Furthermore, FERS gas sensing is applied in industrial and environmental process monitoring. Newly developed optical fibers and further advances in the field might increase sensitivity and stability.

Keywords

Raman spectroscopy; gas sensing; fibre enhanced Raman spectroscopy; photonic crystal fibre; hollow core fibre; multigas analysis; metal coated fibre; medical gas sensing; environmental gas sensing; industrial gas sensing

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