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Acetylene sensor based on the tunable laser spectroscopy method and the correlation spectroscopy principle

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In this work an acetylene sensor based on a tunable fiber laser and a correlation spectroscopy stage is presented. Here, it is shown that to implement a gas concentration sensor it is necessary that the fiber laser emission sweeps a fraction of the spectral region where one rovibrational absorption gas line occurs. Moreover, as the fiber laser only interacts with one absorption line of the target molecule, the selectivity of the sensor is very high. Furthermore, it is demonstrated that when the fiber laser emission fluctuated, the measurement errors were minimized by taking advantage of one correlation spectroscopy technique for which two optical channels were implemented. Numerical simulations describing the sensor principle of operation are provided and these are strongly supported by experimental measurements, which gives confidence that this methodology can be applied to design other gas sensors.

Biography

Guzman-Chavez A D graduated as an Electronic and Digital System Engineer from Universidad Panamericana Campus Bonaterra in 2003 and received an MSc and PhD in Science (Optics) from the Optics Research Center (CIO) in 2007 and 2010 respectively. She worked as a Post-doc in the University of Valencia in 2011 in the Department of Physics and Electromagnetism. She joined at the University of Guanajuato in México since 2012 where she was Coordinator of two Master degree programs from 2014-2016. Currently, she is working as a Professor and is interested in optoelectronic sensors and fiber lasers. She has published more than 15 papers in well known journals.

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