Jean-Francois Feller et.al., J Material Sci Eng 2018, Volume 7
DOI: 10.4172/2169-0022-C6-107

Different strategies to Taylor quantum resistive vapor sensors functionality to detect sub ppb of volatile biomarkers

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Sensing volatile organic compounds (VOC) with quantum resistive sensors (vQRS) is a promising approach for the development of noninvasive, fast and inexpensive tool for the anticipated diagnostic of diseases and monitoring of exposition to toxic molecules. Different strategies of tailoring of the chemical selectivities of vQRS by the assembly of polymer nanocomposite conductive architectures of different chemical natures will be presented. The potential of bio-based carbon nanorods (CNR) functionalized with polylactic acid PLA and poly vinyl acetate PVA were found to detect lung biomarkers at the subppm level. Moreover, hybrid copolymers of polyhedral oligomeric silsesquioxane (POSS) and polymethyl methacrylate (PMMA) or polystyrene (PS) with carbon nanotubes (CNT) proved effective to detect hazardous gases at levels as low as 300 ppb of formaldehyde and 500 ppb of ammonia with sufficiently good signal to noise ratio (SNR>10). Finally, the discrimination ability of the different vapor sensors assembled into an array (e-noses) was evaluated after classification of their chemo resistive responses.

Biography

Jean-Francois Feller is a Professor specialized in Physical-Chemistry of Polymer nanocomposites at the University of South Brittany (UBS) in Lorient (France). He has completed his PhD from the University Claude Bernard of Lyon1. He is currently the Head of the Smart Plastics Group and his research concerns the development of nanocomposites for self-regulating heating, temperature and vapor sensing, e-noses. He has published more than 90 papers, 3 books, 8 chapters, 5 Patents and supervised more than 20 PhD theses.

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