

Title:

The enhancement and integration of a gas chromatography-ion mobility spectrometer for clinical diagnostic testing.

Abstract:

Volatile Organic Compounds (VOCs) are some of the most constant, yet undervalued part of our daily lives. These organic compounds are fundamental in inter- and intra-organism interactions and countless biochemical processes. This has led VOCs to be considered as powerful monitoring tools in both industrial and clinical sectors. In particular, their use in the field of breath research has shown considerable promise as diagnostic biomarkers. VOC-based breath biomarkers have been shown in cancer, cystic fibrosis, inflammatory bowel disease, diabetes, and inflammatory lung diseases such as asthma or COPD. Yet, there is still considerable work in establishing diagnostic devices capable of detecting the low concentrations (ppb to ppt) of potential VOC biomarkers in breath. This work will highlight several enhancements to the BreathSpec®, a commercial gas chromatography-ion mobility spectrometer, to increase sensitivity and improve the reproducibility of breath collection procedures. Underpinning this work will be the integration of the device into clinical sites to further develop its diagnostic prowess.