

AMY-MELLON LECTURE

Professor Renato Zenobi

Department of Chemistry and Applied Biosciences
ETH Zurich



“Secondary Electrospray Ionization (SESI) – High Resolution Mass Spectrometry for On- Line Analysis of Exhaled Breath”

On-line chemical analysis of exhaled breath is a powerful approach to obtain insight into the metabolism of a person in real time. With ambient ionization methods, this can be achieved rapidly, with exquisite sensitivity, and completely non-invasively, opening up interesting possibilities to diagnose diseases, to discern diurnal changes in the metabolism, or to monitor drug use (or drug abuse).

The technical background of secondary electrospray ionization-high resolution mass spectrometry (SESI-HRMS) will first be explained, and the figures of merit (mass resolution, upper mass limit, detection limit, softness of ionization, etc.) and the coverage of biomarkers (polarity, volatility, molecular weight, etc.) that can be detected will be elaborated. Several examples for the application of SESI-HRMS in medical diagnosis will then be presented: the detection of novel volatile biomarkers for respiratory diseases such as obstructive sleep apnea (OSA), chronic obstructive pulmonary disease (COPD), or cystic fibrosis. Monitoring of metabolic changes during sleep, following a nutritional intervention, of drug compliance and of pharmacokinetics via real-time SESI-MS will also be shown.