

Breath analysis by extractive electrospray ionization mass spectrometry for biomedical applications

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Extractive electrospray ionization mass spectrometry (EESI-MS) allows direct, sensitive and *in vivo* breath analysis with neither sample pre-treatment (such as sample collection, preconcentration, matrix separation) nor chemical contamination. Breath sample was directly introduced into EESI source and ionized by intersecting with the primary ions generated by electrospraying the solvent (e.g., water/acetic acid). Both of the volatile and non-volatile metabolites can be detected in exhaled breath based on EESI-MS with high throughput, high sensitivity, and high selectivity. As a qualitative and quantitative analytical method, EESI-MS was found to be a rapid and powerful tool to obtain mass-spectral fingerprints of exhaled breath samples. Principal component analysis and other multivariate techniques were used to treat the mass spectral data to screen potential molecular markers. Ions of interest were identified using tandem mass spectrometry. Alternatively, highly selective ion/molecule reactions were implemented so that the compounds with low proton affinity (e.g., acetonitrile, nitric oxide, etc.) were sensitively detected by EESI-MS. Typical examples will be given to show that EESI-MS is a versatile platform for qualitative and quantitative analysis of exhaled breath samples, with emphasis on the potential of EESI-MS for biomedical applications. All the current studies prove that EESI-MS is a useful analytical tool for *in vivo* breath analysis, through which novel insights of human metabolism could be revealed at the molecular level.

Biography

Huanwen Chen, born in December 1973, completed his doctoral thesis in Analytical Chemistry in Jilin University, P. R. China in 2001. During 2003-2005 he was a postdoc at Prof. Graham Cooks group, Purdue University. He was a Simon Fellow at Prof. Renato Zenobi group, ETH Zurich in 2006-2007. Since 2008 he is a full professor in East China Institute of Technology, where he founded the Jiangxi Key Laboratory for Mass Spectrometry and Instrumentation and serves as the Laboratory Director. He received the First Class of Natural Science Award of Jiangxi Province as the chief contributor in 2010. His research interest is to develop new instruments and methods for direct obtaining structure information of molecules in complex samples.

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