FTIR spectroscopic imaging as a tool for rapid and label-free recognition of diseases

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Abstract

This presentation provides an overview on our latest achievements in the field of FTIR spectroscopy and its imaging applied to study blood, cells and tissues derived from human and animal models of several civilisation diseases including hypertensions, diabetes, inflammation of cells, cancer and its metastasis. These studies are based on label-free and non-targeted FTIR spectroscopic imaging for a rapid detection of the early phase in disease progression. IR biomarkers within the complex vibrational spectra are indicative of a pathological or physiological state and can be used to discriminate statistically groups of samples. Very often, this analytical approach is accompanied by attempts of understanding the biochemical information delivered by vibrational spectra and their correlation with the existing diagnostic methods.

About the presenter

Kamilla's research interests began with modelling the absorption properties of molecular crystals at the Department of Theoretical Chemistry. She has been continuing research on the border of "theory and experience" in vibrational spectroscopy since doctoral studies, with particular emphasis on the coordination relationships of bioligands. She defended her PhD in chemistry in 2003 with the work "Application of molecular spectroscopy methods to determine the structures of oximes and their complex compounds with Ni (II) and Cu (II) ions". The ongoing research projects concern the interaction of molecules of bio/medical importance with the Ag and Au (SERS) surface as well as Raman mapping and IR imaging of biological material and wall painting.