Easy Sampling and Analysis FT-IR System for Medical and Biological Diagnostic and Screening

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Since two decades, FT-IR spectroscopy appeared as a promising method for fast and minimally invasive diagnostic[1, 2]. However, it failed to find its way toward routine clinical application so far. One of the reason is the lack of simple tool for non-spectroscopists: ATR plates are easy to use but lack transmission system sensitivity, which are more difficult to use.

Fiber evanescent wave spectroscopy (FEWS) brings some interesting solution[3], however, here again, simple and sensitive tools were missing for biological analysis, as main fiber material on the market are silver halogenides that deteriorates in presence of water, the main biological compound element. Chalcogenide glass fiber was the next step, it made possible to make thinner fibers, hence more sensitive sensor; moreover using a hydro resistant and hydrophobic material allowing better measurement of biological tissues[4, 5]. Here again, the chalcogenide brittleness prevented their development, as well as the use of liquid nitrogen cooled infrared sensor for FTIR spectroscope..

Encapsulated chalcogenide glass fiber sensors, coupled to uncooled detector FTIR spectroscope solves this issue by providing simple and affordable sampling method. They are disposable to avoid any cleaning and cross contamination issue. Their sensitivity and reproducibility has been demonstrated over more than 2 000 measurements. Several diagnostic are currently developed using this system, including liver disease diagnostic using serum analysis, fast septic arthritis detection or bone infection diagnostic. Using such a set up for FT IR diagnostic signature will allow a fast deployment of the results.

References

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