# *A New Approach to Achieving Ultra High Spatial Resolution FTIR Imaging – A Biomedical Tissue Case Study*

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FTIR imaging is now a well-established analytical method for obtaining spatially resolved spectral & spatial information simultaneously in the micron size domain and has been applied across many different application areas, from polymer science to biomedical imaging. Over recent years, interest has increased in pushing the diffraction limited spatial resolution performance of FTIR imaging systems, which have been led by synchrotron based systems. We present here, a novel method of magnification enhancement utilizing existing objectives, affording a ultra high spatial resolution FTIR imaging capabilities in the laboratory in the order of 1 micron/pixel. Furthermore, this implementation for the first time, conserves the relatively large working distance of regular objectives (~25mm), whilst also permitting ultra high spatial resolution ATR imaging, with 0.2 micron per pixel, all using a single objective. Presented here is a study on biomedical samples (mouse brain sections), contrasting data to laboratory based standard magnification, ultra high magnification FTIR Imaging and to that obtained from synchrotron based FTIR imaging systems in terms of both spatial and spectral detail. Results from this new ultra high magnification configuration will be contrasted to standard magnification and synchrotron FTIR imaging data and evaluated in terms of spatial and spectral quality. Additional polymeric example will also be presented.

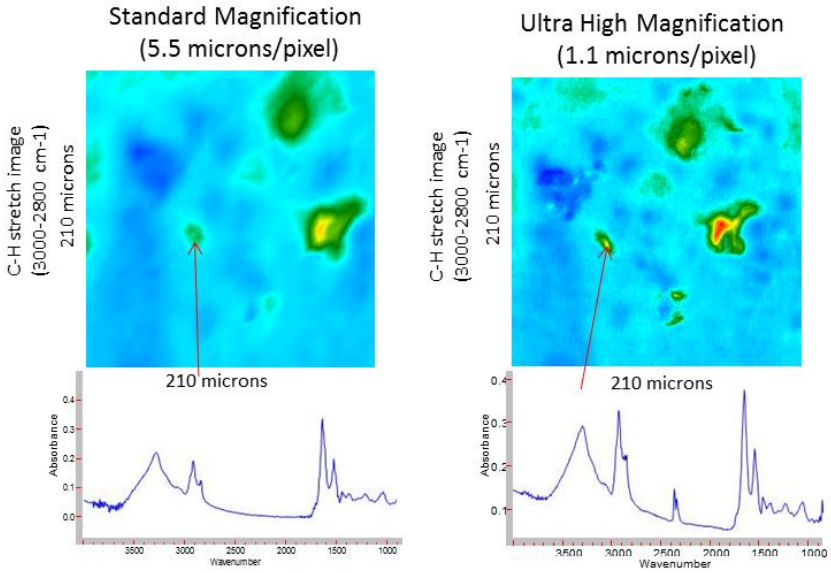


Figure 1. Spatial and spectral comparison if lipid inclusion. Upper: Standard magnification at 5.5 microns/pixel, Lower: Ultra High Magnification at 1.1 microns/pixel. Note the extra spatial detail and stronger C-H stretching signal (3000-2800cm-1) in the ultra high magnification image.