

Room 223, building 206, Friday, May 20, 11.00 A.M.

RAMAN LECTURE 2

Raman Spectroscopy; An Analytical Tool for the 21st Century

Guest Prof. at Department of Chemistry, DTU
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Brayford Pool, Lincoln, LN6 7TS

Forensic laboratories seek techniques that are non-destructive, provide good sensitivity and offer a high degree of discrimination. *In-situ* analytical techniques are also preferred since these can reduce analysis times and overcome extraction problems. From the examples presented it will be shown that as a result of recent advances in instrument design, traditional Raman spectra can be obtained directly on bulk samples.

To examine trace levels of material, the surface enhanced resonance Raman scattering (SERRS) technique would appear most favourable and meet the requirements of the forensic scientist. Results for the *in-situ* trace analyses of dyes and pigments on fibres, in writing and printing inks, and in cosmetics and shoe polish smears deposited on both cloth and glass are presented to confirm this statement. The method described for determining if a document has been altered also shows the potential of SERRS spectroscopy as a non-destructive analytical technique.

Other interesting applications, including the analysis of DNA and a recently patented method that combines SERRS spectroscopy with immunoassay for the analysis of UV absorbing compounds, eg., drugs of abuse, will also be presented. All of these applications indicate that forensic science and other analytical laboratories should strongly consider the use of Raman spectroscopy, and in particular the SERRS technique, not in the future but now.

Peter started his career in 1968 with Glaxo Laboratories as a Research Organic Chemist. Unfortunately, due to suspected penicillin sensitivity had to leave preparative chemistry after 3 years and moved into analytical research chemistry and this was the start of his long and successful career in separation science and analytical chemistry. In 1974 moved to the Metropolitan Police Forensic Science Laboratory (MPFSL) and joined the research group – then regarded internationally as one of the leading research groups in forensic science - to develop new separation and detection techniques to solve casework related problems. His interest in multiwavelength detection techniques and dye analysis grew at the MPFSL and it became the subject of his PhD which he completed as a part-time student at Brunel University. This was awarded in 1992 and a year later in recognition of his research work he was made a Fellow of the Royal Society of Chemistry. After 15 years at the MPFSL, came the move to academia and he joined the Forensic Science Unit at the University of Strathclyde, which was recognised as one of the leading providers of forensic science education in the UK. This move allowed an expansion of his research interests in the trace level detection of dyes and the development Raman spectroscopic methods for use a forensic examinations of drugs, DNA, explosives and many other compounds of forensic interest. As an Authorised Analyst he was also allowed to continue his casework and expert witness duties. Despite a very successful research career, the formation of a spin-out Company, and becoming Director of the Forensic Science Unit whilst at the University of Strathclyde, the new University at Lincoln with its excellent forensic science teaching and research facilities lured him back south of the border. In September 2003, he was appointed as Professor of Forensic Science - only the second Chair in Forensic Science in the UK. Since joining he has started to establish this new research team and was appointed the Head of the new Forensic & Biomedical Sciences Department which was created in August last year. As a result of his research work he has presented papers, keynote and plenary lectures and chaired sessions at many national and international conferences. He has over 60 publications, 6 patents, and contributed chapters to several books. He is also the Editor of Crime Scene to Court. The 2nd edition of this book was released last year and for the publisher - the Royal Society of Chemistry - it is their all-time best seller.



Arranged in collaboration with The quantum Protein Centre, QUP, Department of Physics DTU and Danish Chemical Society (Dansk Forening For Molekylspektroskopi).

