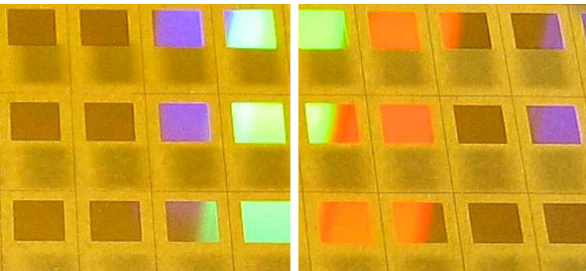




D3 Cleaning Verification

- **The Company**
- **Technology**
- **Klarite™**
- **Applications**





Company



Formed in July 2007

Major investment by Renishaw plc, a worldwide leader in imaging & detection systems.

Secure finances, avoiding the Venture Capitalist route

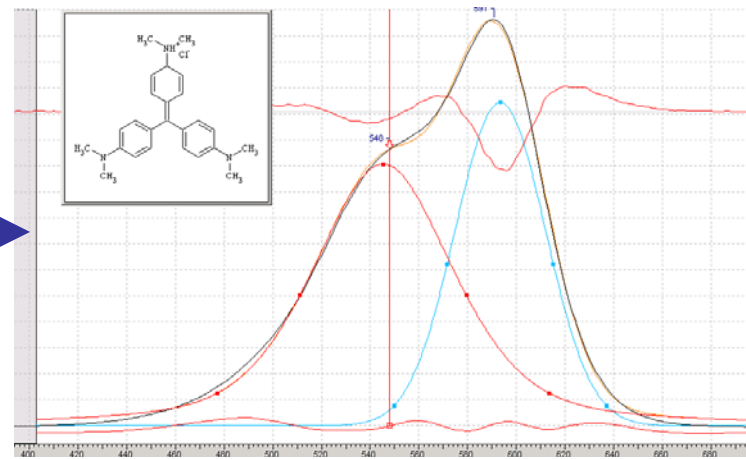
R&D led, based at advanced research facility, Glasgow, UK

Strong IP portfolio in our core technology based on Surface Enhanced Resonance Raman Spectroscopy: SERRS



- 3000 sq metre facility
- Bio-labs for DNA analysis; Class100 Clean Room; Wet Chemistry, Colloid Prep and Spectroscopy suites

Surface Enhanced Raman Spectroscopy (SERS) What is it?



- SERS is an analytical technique for trace levels of soluble samples, providing information on molecular structure, identity and quantity



So Why SERS

So why SERS?

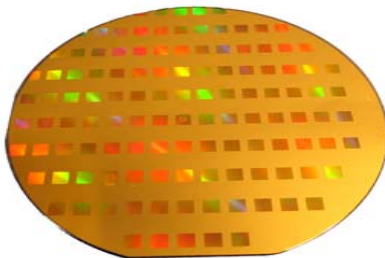
- Capable of detecting analytes in parts per billion range – **extreme sensitivity**
- Directly applicable to wide sample range – **flexible applications**
- Target analytes give characteristic spectra – **high specificity**
- Short data collection times – **rapid analysis**
- Compatible with wide range of instrumentation – **adaptable technology**

D3 Technologies has extensive experience of using SERS based methods for a wide range of applications, for everything from explosives detection to clinical diagnostics.

D3 regularly undertake funded research programs for process development in a variety of fields.

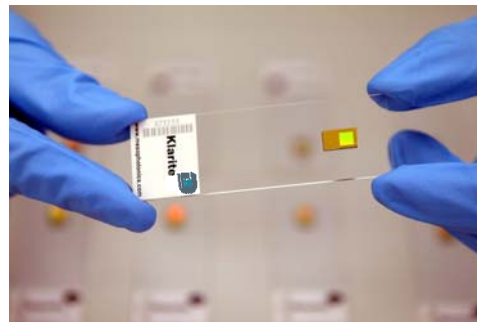
Features

- Gold patterned surfaces
 - $\sim\mu\text{m}$ wells
- Semiconductor fabrication
- Proprietary engineering
- Customization possible



Performance

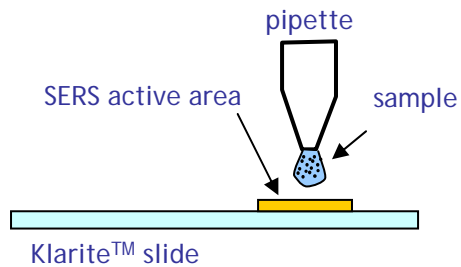
- High reproducibility
 - RSD $\sim 5\%$
 - batch-to-batch
- >10 yrs shelf life
- Demonstrated for
 - **Small molecules**
 - **Proteins**
 - **Spores/viruses**



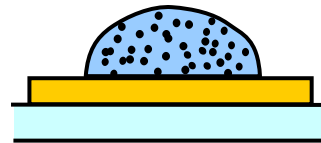
Readiness

- commercially available off-the-shelf
- Certification in progress (ISO 9001)
- QMS/GMP

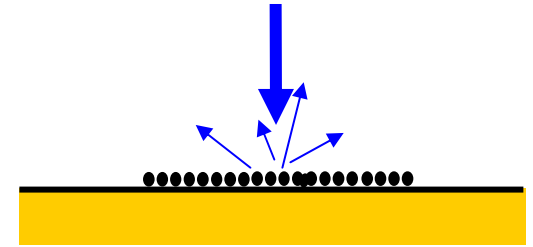




1. Deposition



2. Evaporation

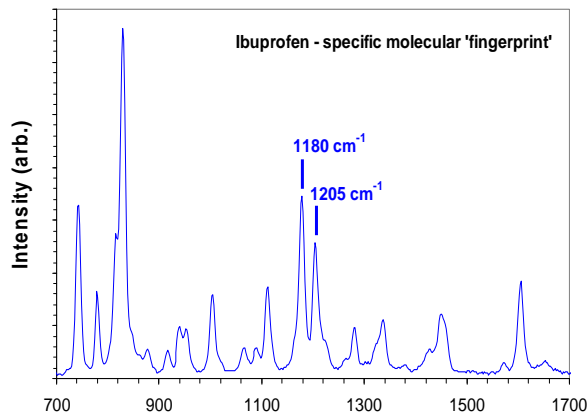


3. Measurement

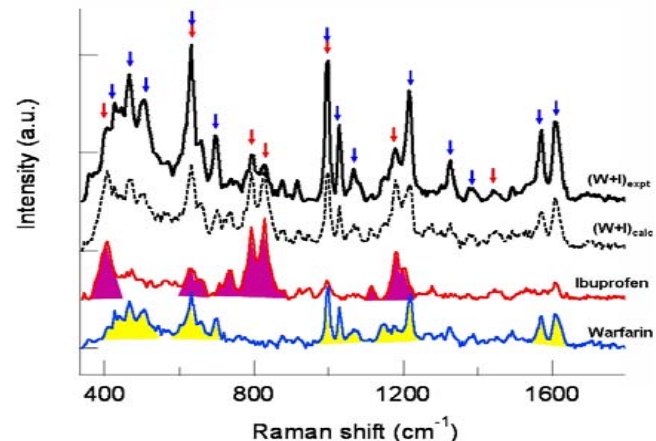
- 1-2uL solution.
- Dilute solution to avoid bulk Raman: LOD as low as 1 ppb.
- Limit of detection is analyte dependent.



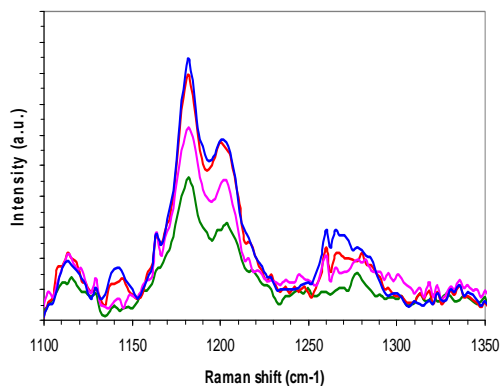
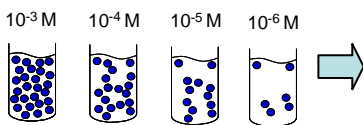
Bio-Pharmaceutical application – example



MOLECULAR FINGERPRINT



ANALYSIS OF MIXTURES



QUANTIFICATION

