Trinity College Dublin

High Resolution Optical Microscopy

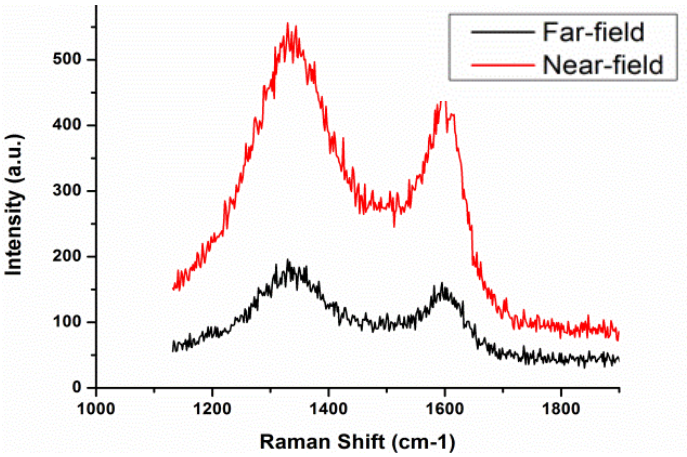
Available for License

Basic overview

In CRANN, Trinity College Dublin, we have developed an innovative technology which provides a sub wavelength laser spot that **enables sub-micron (nano-scale) spectroscopic analysis for surface chemistry, morphology and chemical analysis with high levels of excitation power and enhancement signals** with ultimately **higher spatial resolution**.

The arrangement can also be used to produce a system for **nanolithography** where optically active polymers can be used as the basis for surface features at sizes of 100 nm or less. Nanolithography can be carried out in parallel with imaging and the optical properties of both microspheres and microdisk structures are well understood allowing for creation of optical spots with small diameter and low divergence.

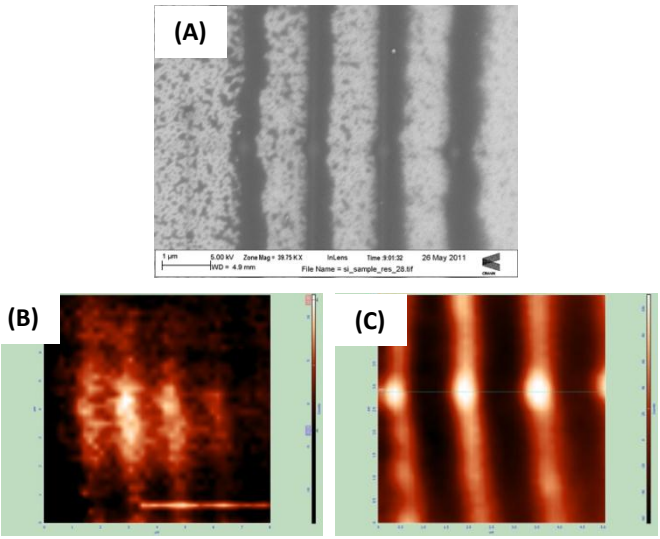
The system is very simple in design and our simulations show that structures in size of less than 100 nm can be easily fabricated.



Black line: Raman spectrum obtained from carbon grid by using normal Raman spectrometer.
Red: Enhanced Raman spectrum of carbon grid from the same point by using our technology.

Advantages

- **Higher resolution** than current systems
- **Higher signal levels** than conventional Raman/ fluorescence spectroscopy
- **Cost effective**
- Robust set-up
- Capability to modify set-up for nano lithography with 100 nm structure size



(A) SEM image of carbon grid; (B) Far-field Raman image; (C) Near-field Raman image from same area by using our technology. The width of the carbon wire is 129 nm which is same as the measurement in SEM image.

Applications

This modification can give enhanced imaging capability for optical microscopy. In addition to this, there is capability to use this simple structure to carry out nanolithography.

Therefore, there are several applications for this technology:

- Nano lithography
- Strain sensing – can measure very localised stress/strain in sub-micro scale
- High resolution optical microscopy

The opportunity

This technology is available for license and we are also interested in working with a partner to evaluate and develop this technology with us.

Technology and Patent Status

Considerable know-how is employed to perfect this technique and this can be licenced to interested parties.

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www.crann.tcd.ie/Industry-Commercialisation/Available-Technologies.aspx

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