Advanced Microscopy
Biosensor
Carbon Nanotubes
Fabrics of the Future
NanoArrays
Nanopigments
NanoParticle Diagnostics
Pulmonary Drug Delivery
Transdermal Delivery
Water Probe

Water Probe

Nanotechnology Victoria has committed $125,300 for development of a portable high-sensitivity probe for the detection of contaminants in water. NanoVic is collaborating with experienced local laser systems manufacturer OptoTech Pty Ltd, and Swinburne University of Technology, who bring proprietary optical fibre technology. The total value of the Project is $345,900, and it will run for six months from February 2007.

Raman Spectroscopy utilises an intense laser light source to illuminate a sample in which a small portion of the light is shifted in a characteristic manner. This provides a spectrum (a signature), which can then be compared against spectral libraries to provide a chemical identification. No sample preparation is required, and the Raman signal is unaffected by glass containers or water content.

Surface Enhanced Raman Scattering (SERS) exploits an effect whereby chemicals in close proximity to a roughened metal surface (usually gold or silver) have a greatly increased Raman response (typically by a factor of 106). The significantly increased sensitivity of the SERS technique opens an opportunity for the development of new instrumentation.

The main obstacle in the development of SERS based instrumentation is the limited availability of SERS probes (disposable optical elements selectively coated for generating a SERS response). Dr Paul Stoddart from Swinburne University of Technology, a Research Fellow at the Centre for Atoms Optics and Ultrafast Spectroscopy, has developed proprietary nanostructured fibre tips able to be used for SERS analysis. The optical fibres provide an inexpensive solid-state solution of enhanced sensitivity. Dr Stoddart was awarded a Victoria Fellowship in 2006 for his work in this area.

The laser system takes advantage of the optical fibre Bragg grating fabrication capability at Swinburne University. This facility can produce in-fibre filters that will be used to reduce the laser linewidth to the level required for Raman spectroscopy. The novel combination of a fibre-coupled laser and SERS fibre probe is expected to lead to a proprietary system that is compact and robust and that offers a unique, cost-effective capability for SERS analysis in the field.

The proposed program will develop a prototype of a field instrument for the rapid detection of contaminants in water. The product to be developed would supply a currently un-met demand for field instrumentation.

For further information or enquiries concerning this project, please contact Dr Sarah Morgan via email or telephone +61 3 9902 0040.