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## BUSINESS LEADS

27 October 2005

Nanotechnology | Licence | Bangalore

### Nanotubes that go with the flow in Bangalore

Seema Singh, in Bangalore

**Physicists in Bangalore have developed new uses for carbon nanotubes – as flow sensors. Now they are looking for more licensees to develop their work.**

A team of physicists at the Indian Institute of Science in Bangalore, sprung a surprise on the scientific community two years ago when they showed that the wonder material, 'carbon nanotubes' had some more spectacular properties: they could generate electricity when placed in flowing liquid.

Their research, published in *Science*, created immense interest globally. A year later, Ajay K. Sood and colleagues made an even bolder announcement in *Physical Review Letters* that the buckytubes generated electric current not only in flowing liquid but also when gas was blown over them at an incline. Interestingly, the newfound properties were seen not only in carbon but also in nanotubes of other materials like copper, and semiconductors.

What the researchers did sounds elementary: they attached electrodes to the top and bottom of a bundle of nanotubes and suspended them in a glass tube. After pumping water through the tube they found that the flow of water produced a voltage that could be measured. The voltage rose as the flow velocity increased – in short, a new kind of flow sensor.

Sood said that while generating power as an "energy conversion device" could only be a futuristic application, the usefulness of their tiny device as an extremely sensitive sensor in bio-medical applications was vast. Less than two years later, Sood and his colleagues have licensed their gas flow technology to an American start-up, Trident Metrologies. "It is an exclusive licence to the company under which it will develop the prototype and market it," said Sood. Trident is looking at possible applications in semiconductor industries and gas pipelines.

But there may be other applications. The research team is scouting for licensing deals (either exclusive or non-exclusive) in their liquid-flow technology, for which they have a US patent.

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"One biomedical application that is very likely is the use of this electricity-generating nano device inside blood vessels to power coronary pacemakers," observed Sood. The team has filed two more patents related to the use of carbon nanotubes as vibration sensors, in undersea exploration and in defence, and in accelerometers to measure vibrations on solid surfaces, as during an earthquake.

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