

Scientists earn laurels for 'Sood Effect'

By Johnson T.A./TNN

Bangalore: Some may call it 'high school physics'. Others would like to label it the 'Sood effect' and deem it to be one of the greatest scientific discoveries from India in over 50 years.



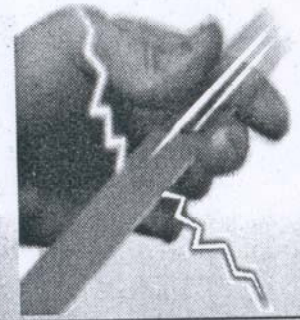
Ajay Sood

The discovery that liquids and gases generate electricity when they flow through carbon nanotubes (tubes that are less than a human hair in size), or even semi-conductors — in case of gases, has propelled two scientists from the Indian Institute of Science into the spotlight of global science.

Until now, electricity was known to be generated when large volume of liquids flowed at high speeds through large turbines as in the case of hydro-electric power.

Experiments by Prof. Ajay K. Sood of the Indian Institute of Science and his colleagues, have shown for the first time, that voltage and electric currents are generated even when liquids and gases flow over solid surfaces at a miniature level.

In 2003, Sood, his student



Experiments by the IISc team led by Prof Sood have shown that voltage and electric currents are generated even when liquids and gases flow over solid surfaces at a miniature level.

Shankar Ghosh and N. Kumar from the Raman Research Institute, in a paper published in the journal 'Science,' stated that a variety of liquids induce electricity in nanotubes — along its flow direction.

Taking these findings further, Sood and Ghosh studied whether gas flow could also generate electricity. In a paper published in the Physical Review Letters, dated August 20, they stated: "an equally striking effect exists for gas flow as well, but for a fundamentally different reason."

"In the case of the flow of liquids, the induced voltage has a logarithmic dependence on flow velocity, while in the case of gases the voltage and current

depends quadratically on the flow velocity," says Prof. Sood.

An interplay of two basic principles of physics — Bernoulli's Principle and Seebeck Effect — established over 200 years ago, were found to be in action when gases flowed through carbon nanotubes and semi-conductors.

The experiments by the IISc team have been compared to Sir C.V. Raman's discovery of the Raman effect and has even earned the nickname 'Sood Effect'. The scientists' 2003 experiments with liquid flow through carbon nanotubes has underlined the possibility of heart pacemakers that do not need batteries but function on power generated by the natural flow of blood alone.

The more recent finding has opened the doors for direct gas flow sensors in sectors like the multi-million automobile industry and chemicals. What has surprised most people is how these findings eluded discovery for nearly two centuries.

"It was not serendipity that led us to our findings. We were driven by an idea and were looking for effects. The answer was not obvious as soon as the data came along," says Prof Sood.

Since Bernoulli's Principle and Seebeck Effect were known for quite a long time, this could have been discovered at least 200 years ago, he admits.

"Science is a never ending process. It is for people to judge the impact of this discovery over time," says Prof. Sood who has been taken aback by the "Sood effect" nickname his findings has earned.

The scientists have secured US and Indian patents for the liquid flow voltage generation experiments, and have applied for a PCT patent for the gas flow findings.

Meanwhile, laboratory experiments on whether self power generating heart pacemakers are possible have commenced, adds Prof Sood.

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