Something in the air: Nanoparticles and ...?

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The world's first machine to simultaneously measure two vital properties of airborne nanoparticle pollution is going on an overseas trip to a leading atmospheric chemistry laboratory in Switzerland.

The analyser, developed by the Queensland University of Technology's International Laboratory for Air Quality and Health, measures the volatile and hygroscopic (water absorbing) properties of nanoparticles emitted from vehicles.

Airborne nanoparticles are believed to have a role in the formation of lung and heart disease.

Nic Meyer and Dr Zoran Ristovski, whose visit is funded by the European Science Foundation, will take the analyser to the Paul Scherrer Institute, near Zurich, where Swiss scientists have built a copy of the QUT machine.

The two devices will be standardised to enable future collaborative research in conjunction with researchers from UK and Swedish universities.

Mr Meyer said the analyser had opened the door to important research into the structure and behaviour of nanoparticles emitted into the air from both man made and natural sources.

"It is the first device in the world that can provide information on two physical properties of tiny airborne nanoparticles simultaneously," he

said.

"Being able to measure these two properties at the same time gives us a greater probability of identifying the components which make up the aerosols.

"The instrument can also strip off atomic layers that make up these particles to give an insight into their structure."

Dr Ristovski said this work could be applied to understanding the health effects of microscopic nanoparticles thought to lodge in the lungs after being inhaled that do not pass out of the body as larger particles do.

"The research shows the smaller the particles are, the more toxic they are," Dr Ristovski said.

"We can't say why they cause heart and lung problems because the mechanism is not yet completely understood.

However, by determining the structure and composition of these particles we can begin to understand the processes involved.

"Once we can describe the properties of nanoparticles, scientists can model their effects on human health."

Mr Meyer's previous research had shown that nanoparticles from diesel emissions came from sulphuric acid, ammonia and water.

"As emission reduction devices have become more prevalent on diesel vehicles there has been a reduction in the black soot component of these emissions," he said.

"This has led to an increase in levels of volatile nanoparticles which

previously clung to the soot emissions.

Determining these particles' make-up will help reduce these emissions and understand their health effects."

Source: Research Australia