New sensor passes litmus test

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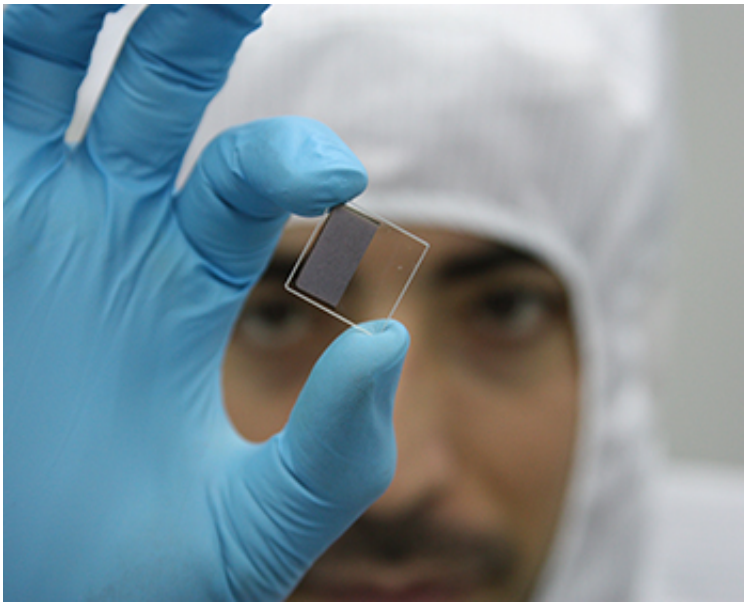

PhD student Ali Sardarinejad holding a thin film of ruthenium oxide used in the new pH sensor.

(Phys.org) —Edith Cowan University researchers have drawn on their expertise in nanotechnology to update the humble pH sensor, replacing traditional glass electrode devices that have been in use since the 1930s with a new sensor thinner than a human hair.

Electron Science Research Institute Director Professor Kamal Alameh said the sensor could have exciting new applications in the oil and gas and medical industries.

"Traditional glass pH electrodes are fragile, expensive, bulky and hard to clean," Professor Alameh said.

"We are currently engaged with people in the oil and gas industry who are interested in using our pH sensor to monitor the pH levels of oil in pipelines."

Researcher Devendra Maurya said the sensor could also be suitable to monitor the acidity in patients' stomachs.

"There are teams working on swallowable pills to monitor patients' bodies from the inside. The new ruthenium oxide sensor could be perfect for such an application," he said.

One of the main challenges in developing the sensor was precisely controlling the thickness of the ruthenium oxide nano-film. ECU's $8 million state-of-the-art cleanroom facility played an important role in getting it right.

"We used a magnetron sputtering system to very precisely produce a layer of ruthenium oxide 500 times thinner than a human hair," he said.

"The ruthenium oxide pH sensors can be miniaturised and cheaply mass produced which opens up many applications that the traditional sensors would not be suitable for."

The research, High-sensitivity pH sensor employing a sub-micron ruthenium oxide thin-film, was recently published in *Sensors and Actuators A*.

Provided by Edith Cowan University