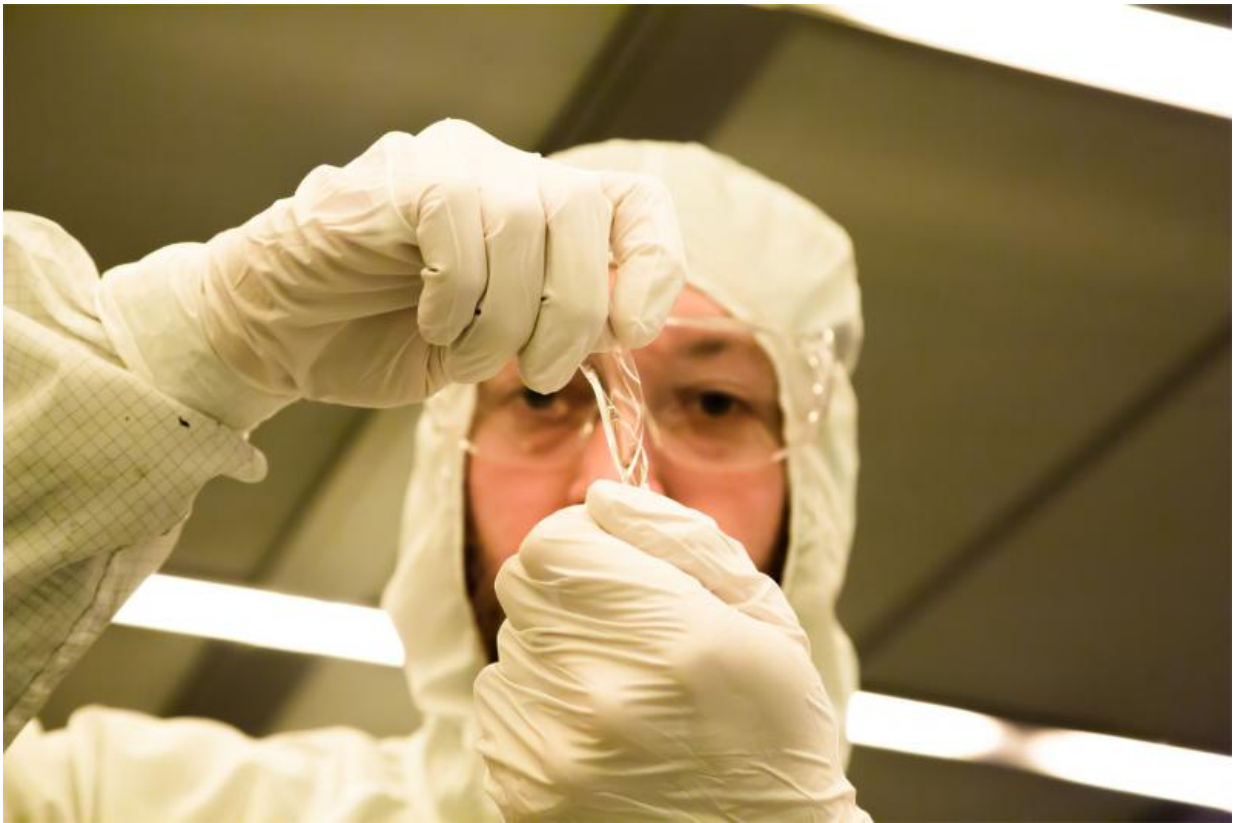


# Stretchy sensors can detect deadly gases and UV radiation

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RMIT University researchers have created wearable sensor patches that detect harmful UV radiation and dangerous, toxic gases such as hydrogen and nitrogen dioxide.

These transparent, flexible electronics – which can be worn as skin patches or incorporated into clothing - are bringing science fiction gadgets closer to real life.

Dr Madhu Bhaskaran, project leader and co-leader of the RMIT Functional Materials and Microsystems Research Group, said the sensors can be placed on work and safety gear to detect dangerous gases.

"Hydrogen leaks can lead to explosions as happened with the Hindenburg disaster and nitrogen dioxide is a major contributor to smog," she said.

"The ability to monitor such gases in production facilities and coal-fired power stations gives vital early warning of explosions, while the ability to sense [nitrogen dioxide](#) allows for a constant monitoring of pollution levels in crowded cities."

The latest development follows RMIT's MicroNano Research Facility breakthrough in bendable electronics which has paved the way for flexible mobile phones.

Lead author, PhD researcher Philipp Gutruf, says the unbreakable, stretchy electronic sensors are also capable of detecting harmful levels of UV radiation known to trigger melanoma.

Much like a nicotine patch, they can be worn on the skin. In future, they will be able to link to electronic devices to continuously monitor UV-levels and alert the user when radiation hits harmful levels.

Gutruf said the research used zinc oxide - present in most sunscreens as a fine powder mixed into a lotion - as the UV sensing material.

Zinc oxide was used in the form of very thin coatings over a hundred

times thinner than a sheet of paper.

"This thin [zinc oxide](#) layer is engineered with a plate-like structure that we call micro-tectonics, these plates can slide across each other bit like geological plates that form the earth's crust allowing for high sensitivity and the ability to bend and flex the devices," he said.

Dr Bhaskaran said the sensors are cheap and durable – attributes which will see [flexible electronics](#) and sensors become an integral part of everyday life.

**More information:** "Stretchable and Tunable Microtectonic ZnO-Based Sensors and Photonics." *Small*. doi: 10.1002/sml.201500729

Provided by RMIT University

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