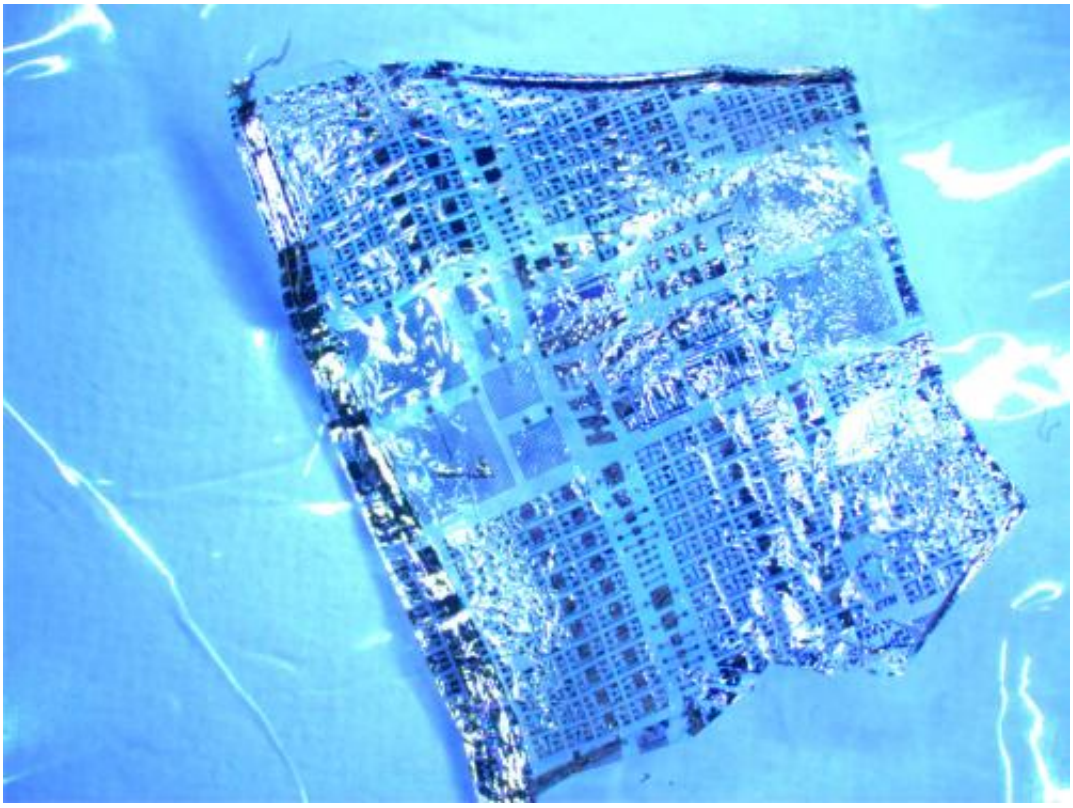
# Ultra-flexible chip can be wrapped around a hair

January 7 2014



Ultraflexible electronics can be achieved by dissolving a sacrificial polymer layer and releasing a thin polymer film from a host substrate. Credit: Salvatore et al

Scientists in Switzerland said Tuesday they can create electronic chips so flexible they can be wrapped around a human hair.

The technique entails building an electronic circuit on top of a sandwich

of polyvinyl layers perched on a hard base.

The wafer is then placed in water, which dissolves two of the polyvinyl layers and causes the base to be released, sinking to the bottom of the lab dish.

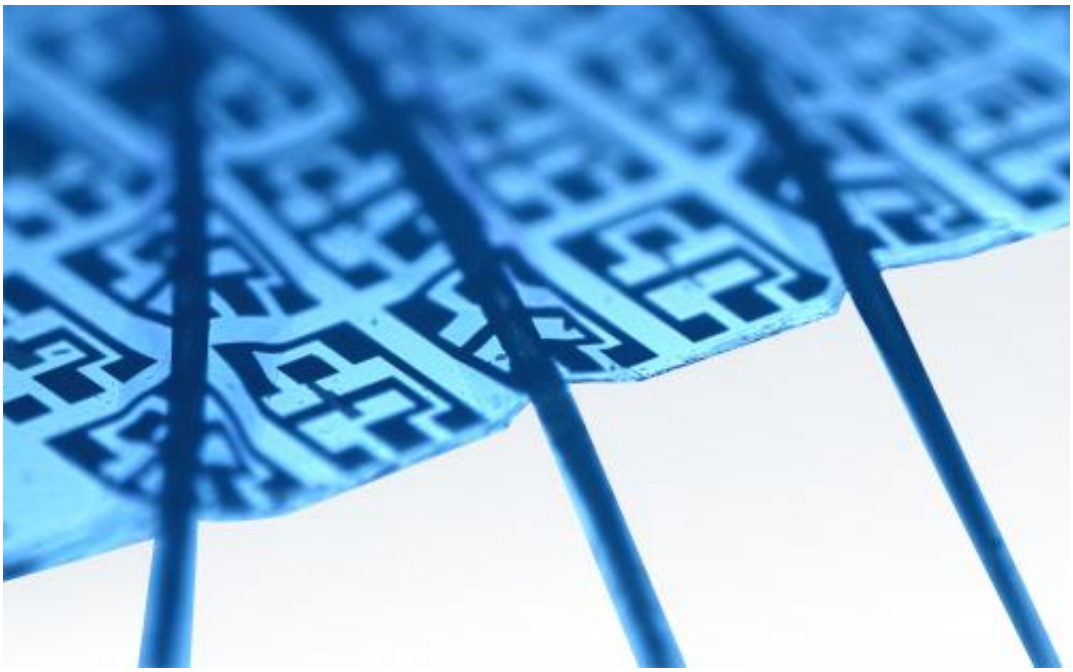
What remains is a circuit embedded on a light, transparent non-soluble polymer film called parylene that is just one micrometre, or a millionth of a metre, thick.

The transistors continue to work even when wrapped around a human hair, which is about 50 micrometres thick, according to the research published in the journal *Nature Communications*.

The ultra-bendable chip may have medical uses, and has already been tested on an artificial eye in the lab.

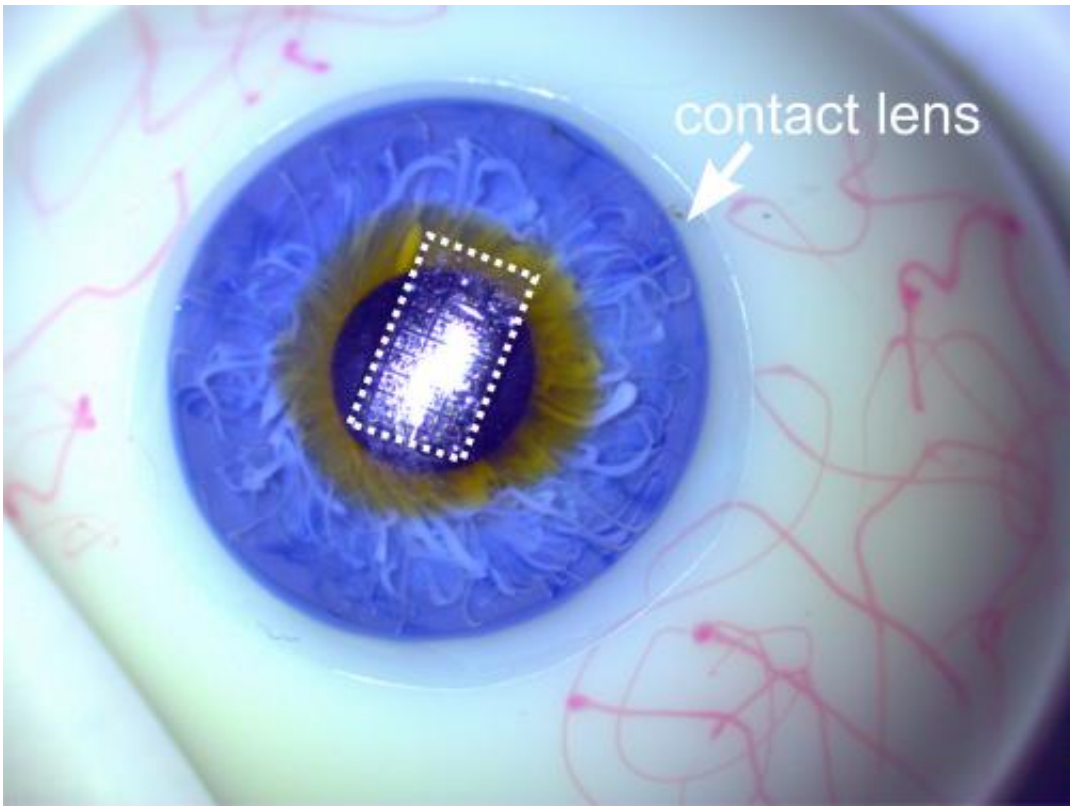
It was added to a contact lens to provide a monitor for glaucoma, in which pressure builds up dangerously in the eyeball, said the team.

The invention also has many other potential outlets, from flexible solar cells to wearable bio-sensors, they said.



Substrate wrapped around hairs. Credit: Salvatore et al

The electronics "can be transferred on any object, surface and on biological tissues like human skin and plant leaves," according to the study led by Giovanni Salvatore at the Swiss Federal Institute of Technology in Zurich (ETZ).




The use of transparent materials enable the realization of transparent devices which can be transferred on to plastic contact lenses and can be used to monitor intra-ocular pressure for glaucoma. Credit: Salvatore et al

**More information:** Paper: dx.doi.org/10.1038/ncomms3982



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