EPFL-TTO

EPFL Innovation Park J
CH-1015 Lausanne
Switzerland
+41 21 693 70 23
http://tto.epfl.ch/

Research Contact

Prof. Stephanie Lacour
+41 21 693 11 81
stephanie.lacour@epfl.ch

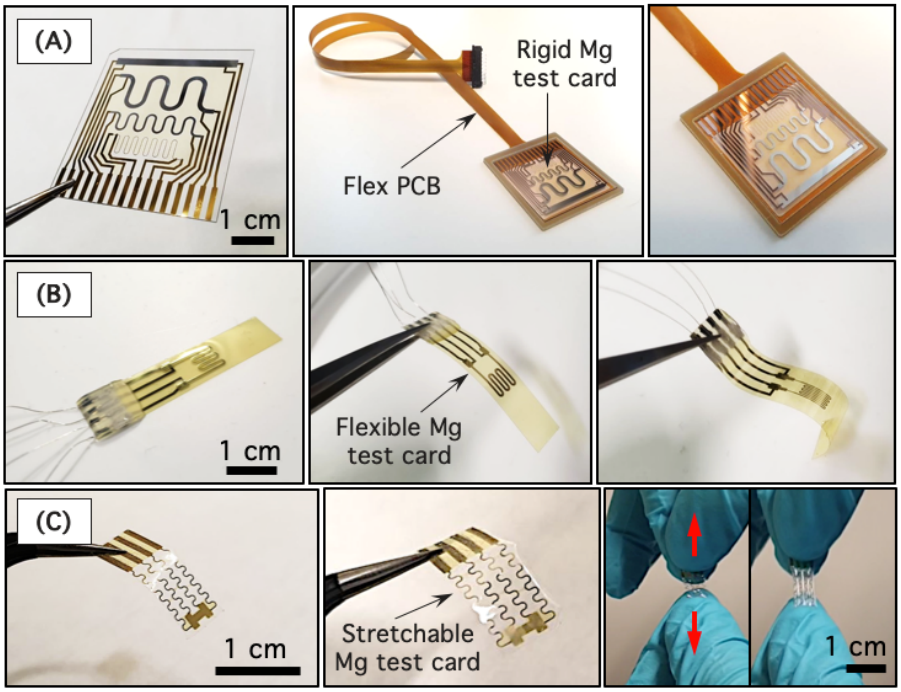
TTO Contact

Dr. Adam Swetloff
+41 21 693 70 37
adam.swetloff@epfl.ch

Licensing Opportunity

TTO – Technology Transfer Office

Ultra-sensitive water permeation sensor



Exemplary sensors: (A) Rigid 5 Mg test cards, connected with a customized flexible PCB. (B) Flexible Mg test cards. (C) Stretchable Mg test cards.

Ref. Nr

6.2290

Keywords

Water permeation, electronic sensor, magnesium, semiconductor

Intellectual Property

PCT/EP2022/072275

Publications

Massimo Mariello et al. 2022 IEEE International Conference, DOI: 10.1109/FLEPS53764.2022.9781582

Date

28/09/2022

Description

Electronic devices or chemicals that are sensitive to water or moisture need to be hermetically shielded from the environment and the permeation accurately monitored. Medical electronic devices in particular are protected through thin, high-barrier encapsulations so that the ability to monitor biofluid penetration in the coating is critical to predict the device's safe and stable operation within the body. The existing permeation sensors either display low sensitivity to permeation or are otherwise not compatible with miniaturised devices. The technology solves this problem by providing an ultra-sensitive sensor that can quantitatively monitor in real-time water or moisture permeation.
The innovation consists in a device for measuring water permeability of ultrathin barrier encapsulations. The sensor relies on the corrosion of Magnesium (Mg) thin films (200 nm) and monitoring the associated electrical/electrochemical properties. Mg is sensitive to water-rich environments but compared to the standard Ca test, Mg film patterns can be processed in standard atmosphere and easily integrated in the microfabrication processes of electronic devices.

Advantages

- Ultra-sensitive to moisture and water permeation
- Compatible with miniaturised devices and new generation soft electronic devices
- Compatible with semiconductor processes

Applications

- Medical devices
- Packaging
- Humidity sensors

Offering

Licensing and/or collaboration