

Here is the high sensitivity sensor to “find” ions

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Two papers signed by researchers from the FBK Center for Materials and Microsystems have been published in Nature -circuit journals

An innovative **ion sensor**, extremely sensitive and able to work efficiently even with low operating voltage. It was designed and developed by a research group that includes **Matteo Ghittorelli**, currently a tenure-track researcher at FBK's Center for Materials and Microsystems, who conducted this research during his previous experience as a post-doc researcher at the Department of Engineering information of the University of Brescia, in collaboration with the Max Planck Institute in Mainz, Germany. The study was recently published in the journal [“Nature Communications”](#).

The dissolved ions present in water and in liquid substances play a key role both for plants, and for animals and humans alike, as they regulate very delicate **biological processes** at the cellular level: these processes are responsible, for example, for the transmission of nerve impulses, for hydration and for the regulation of pH levels. Being able to accurately measure ion concentration levels in aqueous substances is therefore very important, both for **diagnostic purposes** and also for **environmental monitoring**.

The sensor designed by Ghittorelli and colleagues, based on transistor technology, has a **very high sensitivity** despite its low operating voltage. “This aspect is critical since, typically, very sensitive devices require high voltages, which however often make the sensor unusable in aqueous environments”, Ghittorelli points out. Furthermore, the device is inexpensive and can be fabricated relatively easily.

The most interesting applications are in the health field. “This tool can be very useful, for example, to provide **early diagnoses**: thanks to its high sensitivity in small concentrations, it may be able to signal the presence of pathologies in their early stages”, Ghittorelli goes on.

In addition to the work on “Nature Communications”, another article that involved researchers from the FBK CMM Unit was recently published in a Nature-circuit journal, “Flexible Electronics”. This [research](#), signed by **Leandro Lorenzelli** – Head of the MST (Micro Systems Technology) Unit – in collaboration with three researchers from the University of Glasgow (including two, **Shoubhik**

Gupta and **Ravinder Dahiya**, who worked for FBK), represents a review on the state-of-the-art on research on flexible electronics. The goal of this line of research, which sees FBK and the University of Glasgow collaborating since 2010, is to apply electronics to smart fabrics, with the aim of creating biomedical applications in robotics.

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