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Edible electronic devices and power sources for future edible electronic systems

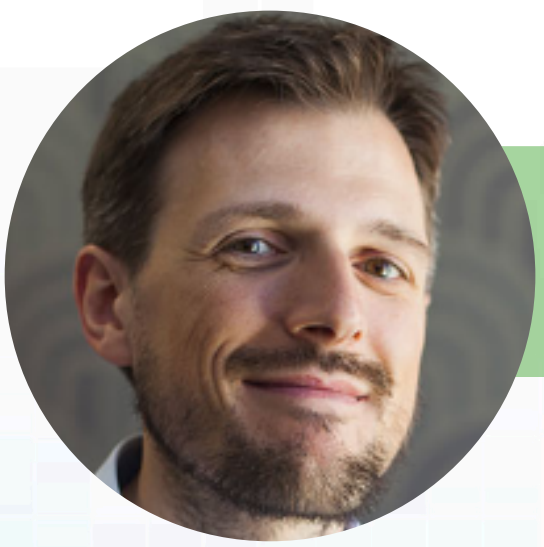
Abstract

Edible electronics envisions a technology that is safe for ingestion, environmentally friendly, and cost-effective. Differently from "ingestible" electronics, it aims at realizing electronic devices that are degraded within the body after performing their function, either digested or even metabolized, thus removing any retention hazard and not contributing to e-waste. Edible electronics could target a significant number of biomedical applications, such as remote healthcare monitoring, as well as food quality monitoring, in the form edible electronic tags directly in contact with food. Here I report on our recent progress in the selection and formulation of edible functional materials, in the development of edible active electronic components and circuits, as well as edible sensors and power sources. Such advancements allow to foresee the integration of the first proof-of-concept edible electronic systems for smart pills and smart packaging.

lunedì 9 giugno 2025 - Ore 15.30

Aula G

Dipartimento di Chimica, Biologia e Biotecnologie



Mario Caironi

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Mario Caironi is an electronic engineer with a Ph.D. in Information Technology obtained with honours at Politecnico di Milano (Milan, Italy). In 2007 he joined the group of Prof. Sirringhaus at the Cavendish Lab. (Cambridge, UK) as a post-doc, working for 3 years on high resolution printing of downscaled organic transistors and circuits, and on charge transport in high mobility polymers. In 2010 he was appointed as Team Leader at the Center for Nano Science and Technology@PoliMi (CNST) of the Istituto Italiano di Tecnologia (IIT, Milan, Italy). In 2014 he entered the tenure track at the same institution, obtaining tenure in 2019. He is currently interested in printed and sustainable microelectronics, edible electronics and printed organic biosensors. He is a 2014 ERC Starting grantee and a 2019 ERC Consolidator grantee. Currently he is the coordinator of the project GRETA, funded within the EIC Pathfinder Challenge on Responsible Electronics, and aimed at enabling green, organic and printed ultra-high frequency electronics.