



UNIVERSITÀ  
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### **MiMETIC - Microwave Metadevices based on Electrically Tunable organic Ion-electron Conductors**

MiMETIC will lay the foundation for a new generation of electrically reconfigurable microwave devices actively tuned by organic electrochemical transistors, a class of electronic devices that exploits the unique properties of organic mixed ion-electron conductors. The project will study the unexplored fundamental properties of these emerging materials in the microwave spectrum, as well as address the groundbreaking implications of this novel metadvice tuning strategy within the fields of tunable/programmable metasurfaces for large-area microwave optics, wireless communication and untethered bioelectronic interfaces. Indeed, despite their widespread use in printed electronics, energy harvesting, organic bioelectronics and neuromorphic devices, the exceptional potential of organic electronic materials and transistors has in fact been largely overlooked in the context of microwave technology. The ambitious plan of MiMETIC has thus the following objectives: i) the microwave characterization of organic mixed conductors across the 1-100 GHz range, thus validating this metadvice tuning strategy in a frequency range that is expected to have significant relevance for present and future wireless technologies (e.g. 5G and 6G); ii) the realization of reconfigurable metasurfaces on large-area and thin flexible substrates, adopting only high-throughput deposition techniques; iii) the demonstration of a novel class of microwave devices and metadevices that exploit the unique capabilities of organic mixed conductors, in particular towards the realization of wireless bioelectronic interfaces for healthcare and distributed sensing, as well as of neuromorphic and exotic photonics. MiMETIC will thus expand the already remarkable technological significance of organic mixed ion-electron conductors by establishing a new generation of microwave devices and metadevices with radically enhanced pervasiveness and utility, as well as create new interdisciplinary research opportunities.

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**Find out more:** <https://cordis.europa.eu/project/id/101116135>