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## Electrochemical paper-based (bio)sensors

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Paper-based colorimetric assays have been widely reported in the literature as cost-effective techniques, not requiring additional components (i.e. pump) for microfluidic handling of the solution (and reagents) and additionally avoiding certain sample pre-treatments owing to the filtering property of the paper. In the last decade, the utility of paper as electrode-active support has been exploited in the electroanalysis field, combining inherent advantages of paper with the features of electrochemistry, such as high sensitivity, selectivity and the capability to work in complex matrices. Herein, we present novel reagentless paper-based electrochemical sensors, which have been manufactured with a simple and inexpensive approach. These have been applied to the determination of several ions, including phosphate, chloride and zinc. By following three easy steps –consisting of wax patterning, paper chemical modification, and electrode screen-printing– the filter paper provides an effective electroanalytical platform to sense phosphate ions in standard solutions and in real samples (river water) as well as chloride ions in serum and sweat samples. Beside the filter paper, also the regular office paper (with different rheological properties) has been investigated as substrate to print the electrode. Thus, an office-paper based sensor has been developed for monitoring of Zn(II) in biological fluids. Overall, particular features of paper, such as filtering and loading properties as well as foldability, have been exploited to design smart electrochemical tools in the form of origami paper-based (bio)sensors for the detection of pesticides and chemical warfare agents.



Fabiana Arduini is Associate Professor at the Department of Chemical Science and Technologies (Tor Vergata University), CEO of SENSE4MED company, RGQ of Certified Laboratory ISO9001 LabCap (Department of Chemical Science Technologies, Tor Vergata University) and Coordinator of Italian Sensor group (2019-2021) in the Italian Chemical Society. Her research activity deals with the development of bioassay and biosensor systems, electrochemical (bio)sensors, electrochemical mediators, screen-printed electrodes, sensors and biosensors modified with nanomaterials, paper based (bio)sensors. Prof. Arduini has published more than 90 papers, with *h*-index 37, and 3500 citations. She is actually Coordinator of the European Project ERANETMED NanoSWS, the INNOCONCRETE project within Executive Programme on Scientific and Technological Cooperation between Italian Republic and the Kingdom of Sweden (2018-2020), and the Italian project BIAPTABONT funded by Ministry of Defense.