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## **A field effect transistor biosensor with a g-pyrone derivative engineered lipid sensing layer for ultrasensitive Fe<sup>3+</sup> ion detection with low pH interference**

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Iron is one of the most important intracellular metal ion. This is due to the flexible coordination chemistry and redox activity of iron that allows it to associate with proteins, and bind to oxygen and transfer electrons or mediate catalytic reactions. Speciation between Fe<sup>2+</sup> and Fe<sup>3+</sup> is therefore a major issue in understanding the biochemical cycling in metabolic processes. Sensing methods capable of providing quantification of the available iron pool in biological samples are therefore of considerable interest. We report here a detailed study on the performances of a novel BioFET for the detection of Fe<sup>3+</sup> ions based on the use of an engineered lipid monolayer as both gate dielectric and sensing layer. Commercial lipids were specifically cleaved with an enzyme then tethered to a g-pyrone derivative exhibiting high specificity and sensitivity towards ferric ions and a low sensitivity over a large pH range, the later making the device perfectly suitable for biomedical applications. High sensor sensitivity is demonstrated with the detection of ferric ions at concentrations as low as 50 fM. To the best of our knowledge, this detection limit is referred to be among the best values ever reported in literature for detecting ions. High specificity including speciation between Fe<sup>3+</sup> and Fe<sup>2+</sup> is also shown with affinity constants 10<sup>6</sup> times higher for ferric ions than for other potential competitors. These results are very promising, and we believe that because of their handiness, such type of sensors is very promising for point of care biosensing diagnostic applications and biological studies.

### **Biography**

Anne Charrier has completed her PhD at the age of 26 years from Aix-Marseille University and postdoctoral studies from Madison University School of Chemical Engineering. She also worked two years in NRC lab SIMS in Ottawa. She is a member of the National Comity of CNRS and has published over 25 papers in reputed journals.

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