Interfacing functions: supramolecular chemistry enabling high-performance pressure sensors and neuromorphic computing

Paolo Samorì

ISIS, Université de Strasbourg, 8 allée Gaspard Monge, 67000 Strasbourg (France). samori@unistra.fr

samori@unistra.fr

The remarkable characteristics of 2D materials can be further refined, expanded, and improved by integrating them with specifically designed molecules, utilizing principles of supramolecular chemistry. By leveraging the extensive range of molecules that can be tailored and synthesized with specific functionalities, it becomes possible to engineer 2D materials with adaptable physical and chemical characteristics. This approach enables the emergence of novel functionalities, aiming to develop multifunctional hybrid systems suited for electronic applications beyond CMOS technology, in line with the "more than Moore" strategy of functional diversification.[1]
In my lecture, I will present our recent advances in employing chemical strategies on colloidal dispersions of 2D nanosheets and hybrid networks thereof, and demonstrate their outstanding and tunable characteristics in proof-of-concept applications. These include flexible pressure sensors with improved performance metrics[2] for both cardiovascular health monitoring[3] and smart insoles-based gait analysis, as well as sophisticated, multi-responsive optoelectronic systems[4] and optoionic memories powered by biopolymer hydrogels [5] capable of mimicking neuromorphic logic functions.[6]

References:

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