

Water-based, defect-free and biocompatible 2D material inks enabled by supramolecular chemistry

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Solution processing of 2D materials [1] allows simple and low-cost techniques, such as ink-jet printing, to be used for fabrication of heterostructure-based devices of arbitrary complexity. Our group has developed highly concentrated, defect-free, inkjet printable and water-based 2D crystal formulations, by exploiting non-covalent functionalization of 2D materials with pyrene derivatives [2]. Examples of printed heterostructures, such as arrays of photosensors, programmable logic memories, capacitors and transistors will be discussed [3-5]. Furthermore, inkjet printing can be easily combined with materials produced by chemical vapor deposition, allowing simple and quick fabrication of complex circuits on paper, compatible with CMOS technology [6-7]. Finally, I will show that the use of pyrene derivatives as supramolecular receptors enables to easily tune the surface chemistry of the material making it suitable for biomedical applications [8-9] and gas sensing.

References

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