

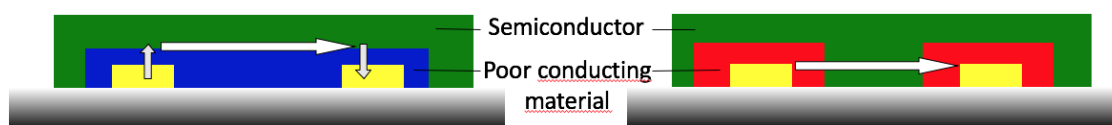
## Molecular material - based heterojunctions as gas sensors

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Abstract: The electrical properties of molecular materials will be discussed and two types of heterojunctions as well. We will show that the energy barrier plays a key role in the performance of gas sensors. Thus, the electrografting of an organic layer on the electrodes is a versatile and promising method for the tuning of heterojunctions performances. The modified heterojunctions favorably compete other conductometric transducers for the detection of ammonia, with a limit of detection as good as 140 ppb, at room temperature and in a broad range of relative humidity.



Schematic view of two types of molecular material-based heterojunctions used as gas sensors

- [1] M. Mateos, R. Meunier-Prest, J.-M. Suisse, M. Bouvet, Modulation of the organic heterojunction behavior, from electrografting to enhanced sensing properties, *Sens. Actuators B Chem.*, 299, 126968, **2019**,
- [2] M. Mateos, M.-D. Tchangäi, R. Meunier-Prest, O. Heintz, F. Herbst, J.-M. Suisse, M. Bouvet, The low conductive electrodeposited poly(2,5-dimethoxyaniline) as a key material in a double lateral heterojunction, for sub-ppm ammonia sensing in humid atmosphere, *ACS Sensors*, 4, 740-747, **2019**.
- [3] M. Mateos, R. Meunier-Prest, O. Heintz, F. Herbst, J.-M. Suisse, M. Bouvet, Comprehensive study of poly(2,3,5,6-tetrafluoroaniline): from electrosynthesis to heterojunctions and ammonia sensing, *ACS Applied Materials&Interfaces*, 10, 19974-19986, **2018**.