

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.

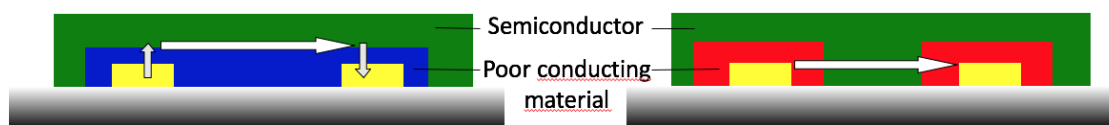


Fig. 1. Schematic view of two types of molecular material-based heterojunctions used as gas sensors

- [1] G. Loma Kikobo, A. Kumar, V. Vibhu, S. Ouedraogo, A. Deshotel, M. Mateos, R. Meunier-Prest, M. Bouvet, Photon Assisted-Inversion of Majority Charge Carriers in Molecular Semiconductors-Based Organic Heterojunctions. *J. Mater. Chem. C*, 9, 5008 – 5020, **2021**.
- [2] 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**.
- [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**.