

## Accepted Manuscript

Title: New n-type Molecular Semiconductor - Doped Insulator (MSDI) heterojunctions combining a triphenodioxazine (TPDO) and the lutetium bisphthalocyanine (LuPc<sub>2</sub>) for ammonia sensing



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PII: S0925-4005(17)31615-5  
DOI: <http://dx.doi.org/doi:10.1016/j.snb.2017.08.184>  
Reference: SNB 23051

To appear in: *Sensors and Actuators B*

Received date: 22-5-2017  
Revised date: 21-8-2017  
Accepted date: 23-8-2017

Please cite this article as: A. Wannebroucq, G. Gruntz, J.-M. Suisse, Y. Nicolas, R. Meunier-Prest, M. Mateos, T. Toupance, M. Bouvet, New n-type Molecular Semiconductor - Doped Insulator (MSDI) heterojunctions combining a triphenodioxazine (TPDO) and the lutetium bisphthalocyanine (LuPc<sub>2</sub>) for ammonia sensing, *Sensors and Actuators B: Chemical* (2017), <http://dx.doi.org/10.1016/j.snb.2017.08.184>

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**New n-type Molecular Semiconductor - Doped Insulator (MSDI) heterojunctions combining a triphenodioxazine (TPDO) and the lutetium bisphthalocyanine (LuPc<sub>2</sub>) for ammonia sensing**

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**Abstract**

Molecular Semiconductor – Doped Insulator (MSDI) heterojunctions were designed using a new family of sublayers, namely triphenodioxazines (TPDO). The device obtained by combining the tetracyano triphenodioxazine bearing two triisopropylsilylethynyl moieties as a sublayer with the lutetium bisphthalocyanine (LuPc<sub>2</sub>) as a top layer showed a nonlinear current-voltage characteristic independent of the sign of the polarization, which is the signature of MSDI heterojunctions. Thus, a TPDO was used in a chemical sensor for the first time. Despite LuPc<sub>2</sub> being the only material exposed to the atmosphere, the positive response of the device under ammonia revealed the key role played by the n-type TPDO sublayer. The device exhibits a response stable over time and can operate in a broad range of relative humidity.

**Keywords:** Triphenodioxazine; Molecular materials; Heterojunctions; Conductometric transducer; Ammonia

**1. Introduction**

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