



ID: 03908, 18/07/2019 16:45 - 18/07/2019 16:50, Room 0.5 (ground floor)

**S7. Molecular Materials on Surfaces (DMFC-GEFES)**

(Poster)

**Investigation of enantiosensitive adsorption of chiral organic molecules on magnetic substrates by electron spectroscopies**

Michael Joel Spilsbury<sup>1</sup>, María José Capitán<sup>2</sup>, Andrea Delgado<sup>1</sup>, Miguel Ángel Niño<sup>3</sup>, Juan José de Miguel<sup>4</sup>, Jesús Álvarez<sup>4</sup>

1) Dpto. Física de la Materia Condensada, Universidad Autónoma de Madrid, Spain

2) Instituto de Estructura de la Materia, CSIC, Madrid, Spain

3) IMDEA-Nanociencia, Madrid, Spain 4) Dpto. Física de la Materia Condensada and Institute of Condensed Matter Physics (IFIMAC), Universidad Autónoma de Madrid, Spain

\* Michael Joel Spilsbury Fuentes, michael.spilsbury@inv.uam.es

Recent studies using diverse surface science techniques have revealed inequivalent behaviour when chiral organic molecules of different handedness, called enantiomers, are adsorbed onto spin-polarized substrates. [1,2] Such enantiosensitive features manifest as asymmetries in the valence band spectra of the chemisorbed layers [2] and can be taken advantage of to separate and purify the enantiomers contained in a racemic mixture [3].

In this work a systematic characterization has been undertaken of the electronic structure of homochiral Diphenylethylenediamine (DPEDA) molecules adsorbed on epitaxial Co films on Cu(100). The DPEDA molecules (see Figure) possess two chiral centres situated at the two C atoms of the ethylene backbone; two enantiomers of this molecule are designated (1R,2R)-(+ and (1S,2S)-(-)-DPEDA. Electron spectroscopy (XPS, UPS) measurements have been employed to investigate both the substrate's and molecular electronic states, the charge transfer between the molecules and the ferromagnetic Co(100) substrate and to detect possible enantioselective effects in molecule-surface bonding. Some significant differences associated to the molecule's helicity have been detected, suggesting a stronger interaction between the (S,S) enantiomer and the magnetic Co substrate than for its (R,R) counterpart. This behaviour might be related to the spin filtering capabilities of the chiral molecular layers, [4] and it can have long-ranging implications for applications such as molecular spintronics or chiral resolution of racemic compounds. This research can have far-reaching implications in several technologically important areas such as heterogeneous asymmetric catalysis or the development of carbon-based spintronic materials.

**References**

[1] M. Á. Niño et al., Adv. Mater. 26, 7474 (2014).

[2] F. J. Luque et al., Chimia 72, 418 (2018).

[3] K. Banerjee-Ghosh et al., Science 360, 1331 (2018).

[4] B. Göhler, et al., Science 331, 894 (2011).