

Solvay Colloquium (in Forum B)

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Chirality and spin- from spintronics to water splitting

Spin based properties, applications, and devices are commonly related to magnetic effects and to magnetic materials. However, we found that chiral organic molecules act as spin filters for photoelectrons transmission,¹ in electron transfer,² and in electron transport.³

The new effect, termed Chiral Induced Spin Selectivity (CISS),^{4,5} has interesting implications for the production of new types of spintronics devices⁶ and on electron transfer in biological systems.⁷ The effect was found in bio-molecules and in bio-systems like the photosystem I. In addition, the CISS effect may play an important role in controlling multiple electrons processes, like water splitting. The basic effect will be explained and various applications and implications will be discussed.

[1] Göhler, B.; Hamelbeck, V.; Markus, T.Z.; Kettner, M.; Hanne, G.F.; Vager, Z.; Naaman, R.; Zacharias, H. *Science* 2011, 331, 894.

[2] Mishra, D.; Markus, T.Z.; Naaman, R.; Kettner, M.; Göhler, B.; Zacharias, H.; Friedman, N.; Sheves, M.; Fontanesi, C. *PNAS*, 2013, 110, 14872.

[3] Xie, Z.; Markus, T. Z.; Cohen, S. R.; Vager, Z.; Gutierrez, R.; Naaman, R. *Nano Letters*, 2011, 11, 4652.

[4] Naaman, R.; Waldeck, D.H. *J. Phys. Chem. Lett.* (feature) 2012, 3, 2178.

[5] R. Naaman, D. H. Waldeck, Spintronics and Chirality: Spin Selectivity in Electron Transport Through Chiral Molecules, *Ann. Rev. Phys. Chem.* 2015, 66, 263-81.

[6] Ben Dor, O.; Yochelis, S.; Mathew, S. P.; Naaman, R.; Paltiel, Y. *Nature Communication*, 2013, 4, 2256.

[7] I. Carmeli, K. S. Kumar, O. Hieflero, C. Carmeli, R. Naaman, *Angew. Chemie* 2014, 53, 8953 -8958.

Wednesday 16 November 2016 at 4.30 P.M.

COFFEE AND TEA WILL BE SERVED AT 4.15 P.M. IN FRONT OF THE FORUM B

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