

Putting the Molecules into Molecular Electronics

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The possibility of detecting single molecules and single particles in real space opens up new avenues for what is now called nanoscience. The availability of suitable materials is thereby essential with critical issues such as (i) stability, (ii) performance and (iii) of whether or not one is really dealing with intact, discrete molecules.

This talk has a synthesis driven part in that it introduces novel nanosized molecules which due their molecular design and self assembly behaviour are particularly useful active components of molecular electronics. Scanning tunnelling microscopy and single molecule spectroscopy are used to address these molecules as separate objects and the question of single molecules versus defined supramolecular aggregates is discussed.

Typical functional examples are multichromophoric light harvesting or single-photon emitting complexes, fluorophores for monitoring biological processes at the single molecule level and single molecule field effect transistors.

References:

- (1) Metivier, R.; Nolde, F.; Müllen, K.; Basché, T. *Phys. Rev. Lett.*, **2007**, *98* (4), 47802.
- (2) Palermo, V.; Liscio, D.; Gentilini, A.; Nolde, F.; Müllen, K.; Samori, P. *Small*, **2007**, *1*, 161.
- (3) Jäckel, F.; Watson, M. D.; Müllen, K.; Rabe, J. P. *Phys. Rev. B*, **2006**, *73*, (4), 454231.
- (4) Kastler, M.; Schmidt, J.; Pisula, W.; Sebastiani, D.; Müllen, K. *J. Am. Chem. Soc.*, **2006**, *128* (29), 9526.
- (5) Pisula, W.; Kastler, M.; Wasserfallen, D.; Nolde, F.; Kohl, Ch.; Pakula, T.J.; Robertson, W.F.; Müllen, K. *Angew. Chem. Int. Ed.*, **2006**, *45*, 819.
- (6) Räder, H.J.; Rouhanipour, A.; Talarico, A.M.; Palermo, V.; Samori, P.; Müllen, K. *Nature Materials*, **2006**, *5*, 276.
- (7) Wang, Z.; Dötz, F.; Enkelmann, V.; Müllen, K. *Angew. Chem. Int. Ed.*, **2005**, *44*, 1247.
- (8) Zhi, L.; Wu, J.; Li, J.; Kolb, U.; Müllen, K. *Angew. Chem. Int. Ed.*, **2005**, *44*, 2120.
- (9) Wu, J.; El-Hamaoui, B.; Li, J.; Zhi, L.; Kolb, U.; Müllen, K. *Small*, **2005**, *1*, 210.