

Professor Neville V. Richardson Professor of Physical Chemistry

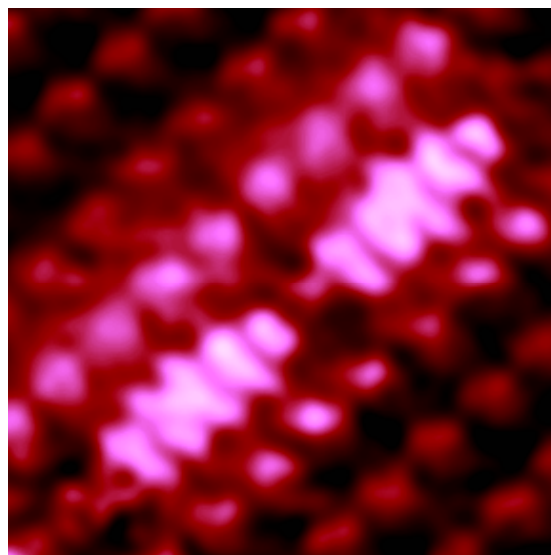
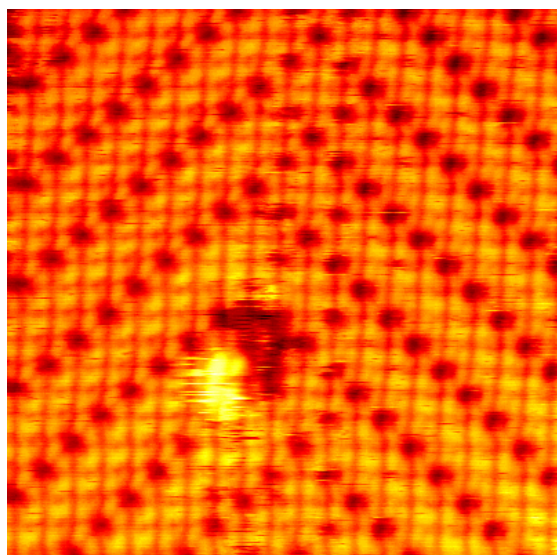
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Research Interests: molecular adsorption on metal and semiconductor surfaces, chirality at surfaces, self-assembly and surface functionalisation

The self-organisation of molecules on a crystalline surface arises from a subtle interplay of interactions between the adsorbed molecules and those between the adsorbate and substrate. An understanding of these processes will underpin advances in many developing technologies, such as biosensors, biocompatible materials, advanced electronics, energy related materials etc. Scanning tunneling microscopy permits the imaging of these interactions at the molecular level, while complementary techniques, such as vibrational spectroscopies provide additional information on molecular conformation and bonding. We exploit these and other techniques of surface characterisation to study the behaviour of small biologically active species (amino acids, nucleic acid bases etc), molecules relevant to molecular electronics, organic electronic devices and other thin film architectures, which are adsorbed on metal and semiconductor single crystal surfaces. The research group has a particular interest in studying issues associated with chirality in two dimensions.



The left image shows an array of tetracene molecules adsorbed on an oxygen covered copper surface while that on the right shows two tetracene molecules on such a surface showing the orbital structure of the HOMO.

SELECTED RECENT PUBLICATIONS

1. S. N. Patole, C. J. Baddeley, D. O'Hagan, N. V. Richardson, F. Zerbetto, L. A. Zotti, G. Teobaldi, and W. A. Hofer J. Self-assembly of semi-fluorinated n-alkanethiols on {111}-oriented Au investigated with STM experiment and theory. *Chem. Phys.* **127** 024702 (2007)
2. N.V. Richardson. Adsorption induced chirality in highly symmetric hydrocarbon molecules: lattice matching to substrates of lower symmetry. *New Journal of Physics* **9** 395-410 (2007)
3. Matthias Treier, Neville V. Richardson, Roman Fasel. Fabrication of surface-supported low-dimensional polyimide networks. *J. Am. Chem. Soc.* **130** 14054 (2008).
4. Matthias Treier, Manh-Thuong Nguyen, Neville V. Richardson, Carlo Pignedoli, Daniele Passerone, Roman Fasel. Tailoring low-dimensional organic semiconductor nanostructure. *Nano Letters* **9** 126-131 (2009)
5. Matthias Treier, Roman Fasel, Neil R. Champness, Stephen Argent and Neville V. Richardson. Molecular Imaging of Polyimide Formation. *Phys. Chem. Chem. Phys.*, **11** 1209-1214 (2009).
6. Stephen M. Francis, W. Edryd Stephens and Neville V. Richardson. X-ray photoelectron and infrared spectroscopies of quartz samples of contrasting toxicity. *Environmental Health 8 (Supp 1):S4* (2009).