

Helical aromatics: from shadow under the spotlight

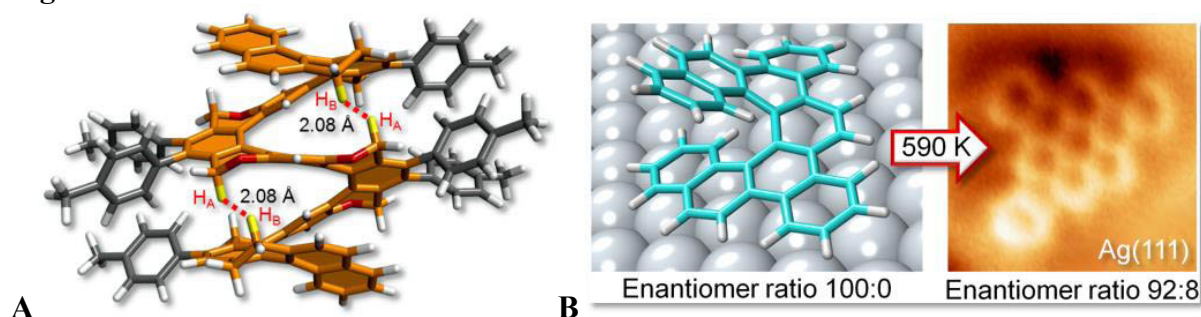
Dr. Irena G. Stará

*Institute of Organic Chemistry and Biochemistry, Czech Academy of Science,
Flemingovo nám. 2, 166 10 Prague 6, Czech Republic — e-mail: stara@uochb.cas.cz*

The recent advances in the synthesis of (hetero)helicenes and their long homologues have given new stimuli to utilising these inherently chiral 3D aromatic systems as functional molecules in enantioselective catalysis, molecular recognition, self-assembly, surface science, chiral materials and other branches of science.

To illustrate that, four studies will be presented: (a) Synthesis of enantiopure helicenes relying on a robust intramolecular diastereoselective [2+2+2] cycloisomerisation of centrally chiral aromatic triynes,^[1–3] (b) synthesis of extremely long (hetero)helicenes by multiple cycloisomerisation of oligoalkynes^[4] (Fig. 1A) and measurement of their single molecule electrical conductance by the mechanically controllable break-junction method, (c) a chemical way of transferring chirality from a homochiral (*P*)-dibenzo[7]helicene to an enantiofacially adsorbed flat dibenzocoronene derivative on Ag(111) through the cascade of enantioconservative on-surface reactions^[5] (Fig. 1B) and, finally, (d) the first observation of the converse piezoelectric effect on a single heptahelicene-derived molecule placed on the Ag(111) surface using AFM/STM microscopy and DFT calculations.^[6]

Figure 1.



References

1. J. Žádný, A. Jančařík, A. Andronova, M. Šámal, J. Vacek Chocholoušová, J. Vacek, R. Pohl, D. Šaman, I. Císařová, I. G. Stará, I. Starý, *Angew. Chem. Int. Ed.* **2012**, *51*, 5857–5861.
2. A. Jančařík, J. Rybáček, K. Cocq, J. Vacek Chocholoušová, J. Vacek, R. Pohl, L. Bednářová, P. Fiedler, I. Císařová, I. G. Stará, I. Starý, *Angew. Chem. Int. Ed.* **2013**, *52*, 9970–9975.
3. M. Šámal, S. Chercheja, J. Rybáček, J. Vacek Chocholoušová, J. Vacek, L. Bednářová, D. Šaman, I. G. Stará, I. Starý, *J. Am. Chem. Soc.* **2015**, *137*, 8469–8474.
4. J. Nejedlý, M. Šámal, J. Rybáček, M. Tobrmanová, F. Szydło, C. Coudret, M. Neumeier, J. Vacek, J. Vacek Chocholoušová, M. Buděšínský, D. Šaman, L. Bednářová, L. Sieger, I. G. Stará, I. Starý, *Angew. Chem. Int. Ed.* **2017**, *56*, 5839–5843.
5. O. Stetsovych, M. Švec, J. Vacek, J. Vacek Chocholoušová, A. Jančařík, J. Rybáček, K. Kosmider, I. G. Stará, P. Jelínek, I. Starý, *Nat. Chem.* **2017**, *9*, 213–218.
6. O. Stetsovych, P. Mutombo, M. Švec, M. Šámal, J. Nejedlý, I. Císařová, H. Vazquez, M. Moro, J. Vacek, I. G. Stará, I. Starý, P. Jelínek, *J. Am. Chem. Soc.* **2018**, *140*, 940–946.