Ryohei Kurata, Akihiro Ito
Kyoto University

M-12-19  Thin Film Thermistor with Positive Temperature Coefficient based on Phase Separated Blends of Ferroelectric and Semiconducting Polymers
Thomas Lenz$^{1,2}$, Hamed Sharifia, Kamal Asadi$^1$, Paul W. M. Blom$^{1,2}$, Wilhelm A. Groene$^3$, Dago M. De Leeuw$^4$
$^1$Max Planck Institute for Polymer Research, $^2$Graduate School Materials Science in Mainz, $^3$Delft University of Technology

M-12-20  Highly Conductive Organic Electrode with Light-driven Conductivity Modulation
Seung-Chul Lee, Jong-Wan Ryu, Suck-Hyun Lee and O-Pil Kwon
Ajou University

M-12-21  Air-stable Multi-cyanated Acenes - A Novel Synthesis Paving the Way for Cyanated Functional Materials
Florian Glöcklhofer, Markus Lunzer, Berthold Stöger and Johannes Fröhlich
Technische Universität Wien

M-12-22  Functional Poly(tetraarylethene)s Constructed by Multicomponent Polycoupling of Internal Diynes, Aryl Diiodides and Boronic Acids
Yajing Liu, Jesse Roose, Jacky W. Y. Lam and Ben Zhong Tang
The Hong Kong University of Science and Technology

M-12-23  Aggregation-Induced Emission of Triphenylethene-Functionalized Tetraphenylpyrazine
Ming Chen$^1$, Anjun Qin$^2$, Jacky W. Y. Lam$^1$ and Ben Zhong Tang$^{1,2}$
$^1$The Hong Kong University of Science & Technology, $^2$South China University of Technology

M-12-24  Wafer-Scale Precise Patterning of Organic Single-Crystal Nanowire Arrays via a Photolithography-Assisted Method
Xiujuan Zhang, Wei Deng and Xiaohong Zhang
Soochow University

M-12-25  Multichannel Conductance of Folded Single-Molecule Wires Aided by Through-Space Conjugation
Zujin Zhao$^1$, Long Chen$^1$, Ya-Hao Wang$^2$, Xiao-Shun Zhou$^2$ and Ben Zhong Tang$^1$
$^1$South China University of Technology, $^2$Zhejiang Normal University

M-12-26  Stability enhancement of PbSe quantum dots via post-synthetic ammonium chloride treatment for a high-performance infrared photodetector
Chunjie Fu, Shengyi Yang, Haowei Wang, Taojian Song, Bo He, Weile Li, Li Zhang, Muhammad Sulaman, Ruibin Liu and Bingsuo Zou
Beijing Institute of Technology

M-12-27  New Polymers for Photovoltaics and NIR-II Imaging

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Air-Stable Multi-Cyanated Acenes – A Novel Synthesis Paving the Way for Cyanated Functional Materials

F. Glöcklhofer, M. Lunzer, B. Stöger, J. Fröhlich

1 Institute of Applied Synthetic Chemistry, 2 Institute of Chemical Technologies and Analytics, TU Wien, Vienna, Austria

Objectives
- Developing a facile new synthesis of cyanated acenes
- Preparing cyanated pentacenes for air-stable n-type transistors
- Shifting solid-state emission of cyanated anthracenes by sterically hindered substituents

The novel synthesis
- Ortho- and para-quinones as starting materials
- First step: formation of silylated cyanohydrin intermediates using trimethylsilyl cyanide (TMSCN) as reagent and KCN or LiCN as catalyst
- Second step: reductive aromatization using PBr₃
- Carried out in a one-pot reaction
- Overall yields ranging from 30% to 79%

Cyanated pentacenes for n-type transistors
A high electron affinity / low LUMO level is one of the prerequisites for excellent materials for n-type transistors. This can be achieved by electron withdrawing substituents such as cyano groups, which can be introduced by the newly developed reaction and which were found to significantly lower the HOMO and LUMO levels of pentacene:
- Pentacene: -4.88 eV (HOMO), -2.70 eV (LUMO)
- 6,13-Dicyanopentacene (DCP): -5.78 eV (HOMO), -3.84/-4.16 eV (LUMO)
- 5,7,12,14-Tetracyanopentacene (TCP): -6.14 eV (HOMO), -4.27/-4.54 eV (LUMO)

Both compounds were prepared from the corresponding quinones in one-pot reactions and are air-stable. LUMO levels below -4.1 eV are expected to result in stable transistors even during operation under ambient conditions. Thermal stability was observed up to 340°C for DCP and 400°C for TCP. The reduction of TCP during cyclic voltammetry (CV) was found to be highly reversible.

Cyanated anthracenes for light emission
- Introduction of phenyl and mesityl substituents to obtain a twisted molecular configuration
- Decreased intermolecular interactions, less red-shifted solid-state emission
- Both strategies successful, detailed evaluation pending
- Synthesis by Suzuki coupling dicyanoanthracene triflates and phenyl/mesityl boronic acids

Conclusion and Outlook
A new synthesis of cyanated acenes has been developed and will pave the way for cyanated functional materials. Promising materials for n-type transistors were obtained by employing this new synthesis to introduce the electron-withdrawing cyano groups.

The emission properties of cyanated anthracenes were successfully tuned by sterically hindered substituents. Our results will guide future investigations towards ambipolar light-emitting materials featuring a dicyanoanthracene core and electron-rich substituents.