European Conference on Chemistry of Two-Dimensional Materials

ABSTRACT BOOK

September 03-06, 2019
Dresden, Germany

www.chem2dmatconf.org

Chem2Dmat 2019

• organisers •

PHANTOMS foundation

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TECHNISCHE UNIVERSITÄT DRESDEN

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Foreword

On behalf of the Organising and the International Scientific Committees we take great pleasure in welcoming you to Dresden (Germany) for the 2nd edition of the European Conference on Chemistry of Two-Dimensional Materials (chem2Dmat2019).

During the last years, the chemistry of graphene has played an ever-increasing role in the large-scale production, chemical functionalization and processing as well as in numerous applications of such material, and it has been expanded to various new 2D inorganic and organic materials. This conference aims at providing a forum to the rapidly growing community of scientists mastering the chemical approaches to 2D materials in order to fabricate systems and devices exhibiting tunable performance. The chemical approach offers absolute control over the structure of 2D materials at the atomic- or molecular-level and will thus serve as enabling strategy to develop unprecedented multifunctional systems, of different complexity, featuring exceptional physical or chemical properties with full control over the correlation between structure and function.

The 2nd edition of chem2Dmat will cover all areas related to 2D materials' chemistry spanning their synthesis as well as their functionalization, using covalent and non-covalent approaches, for composites, foams and coatings, membranes, (bio-)sensing, (electro- and photo-)catalysis, energy conversion, harvesting & storage, electronics, nanomedicine and biomaterials.

chem2Dmat2019 Highlights:

- Expected attendance: 200 participants
- 34 Keynotes & Invited Speakers
- 60 posters
- Nearly 65 oral contributions
- 1/2-day Industrial Forum in parallel to get an updated understanding of Graphene based technologies
- 5 awards to PhD students

chem2Dmat2019 is now an established event, attracting global participant's intent on sharing, exchanging and exploring new avenues of graphene-related scientific and commercial developments.

We are also indebted to the following Scientific Institutions, Companies and Government Agencies for their help and/or financial support:
Technische Universität Dresden, Deutsche Forschungsgemeinschaft (DFG, German Research Foundation), Advanced Materials/Wiley, Journal of Carbon Research/MDPI, Materials Horizons-Nanoscale Horizons/RSC and Nanoscale-Nanoscale Advances/RSC.

We also would like to thank all the exhibitors, speakers and participants that join us this year. In addition, thanks must be given to the staff of all the organizing institutions whose hard work has helped planning this conference.

We truly hope that chem2Dmat2019 serves as an international platform for communication between science and business.

Hope to see you again in the next edition of chem2Dmat to be held in 2021.

main organisers

PHANTOMS foundation

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Humidity sensing with Langmuir-Blodgett assembled graphene films from liquid phase

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Chemical sensors are an enabling tool across many industries, including the largest ones such as energy, transport, and construction. Low-cost, high performance sensors, especially ones compatible with flexible substrates, are becoming increasingly important with the development of mobile gadgets and wearable devices. Here we show humidity sensors produced from thin films of graphene exfoliated in the liquid phase and deposited with Langmuir-Blodgett assembly. The films are formed from connected nanoflakes that are ~120nm in diameter and ~10 layers thick. We show that such films have an abundancy of reactive edges that act as binding sites for gas detection, enabling high sensitivity to gas presence [1]. The method that we demonstrate uses low-cost processes, is highly scalable and consistently yields films of high quality that can be deposited on any substrate, including flexible and transparent ones. We produce our thin films on top of a Si/SiO2 wafer with four contacts for measuring sheet resistance in real time as gas is introduced. The sensors that we make are more sensitive to humidity than ones demonstrated with CVD graphene [2], with up to 30% change in sheet resistance upon exposure to water vapor. Although we demonstrate detection of humidity, the same sensors can be used to detect other, both toxic and non-toxic gases.

References

[1] T. Tomašević-Ilić et al, Appl. Surf. Sci., 1 (2018) 446
[2] A. D. Smith et al, Nanoscale, 45 (2015) 19099

Figures

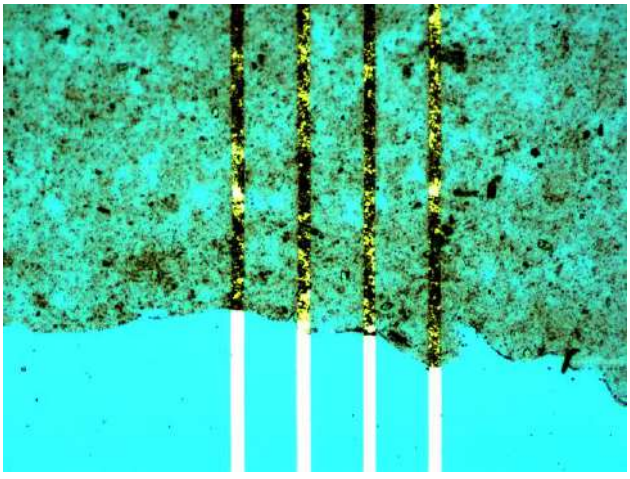

Figure 1: The active area of the graphene sensor on four metallic contacts