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Proton transport through non-covalently functionalized graphene

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Curriculum vitae

Guangya Jiang was born in Anhui, China, in November 1995. From 2013 to 2017, he studied Electronic Science and Technology at Southeast University, where he obtained his Bachelor's degree. In 2017, Guangya continued his academic journey at Tsinghua University as a postgraduate. His thesis, "Research on Flexible Electroluminescent Devices Based on Laser-Derived Graphene", reflected his growing interest in two-dimensional materials and devices. He received his Master's degree in Electronics and Communication Engineering in 2020.

Subsequently, Guangya pursued his doctoral research on functionalized graphene-based electronic devices and proton exchange membranes in the Supramolecular & Biomaterials Chemistry (SBC) group at the Leiden Institute of Chemistry (LIC). His work was conducted under the primary supervision of Dr. Grégory F. Schneider and Prof. dr. Alexander Kros at Leiden University, with additional co-supervision from Dr. Wangyang Fu at Tsinghua University.

His interdisciplinary research also involved collaborations with several external experts. For theoretical and computational studies on the Nafion–graphene interface, he collaborated with Prof. dr. Thomas Heine (TU Dresden, Germany), Dr. Agnieszka Kuc (Helmholtz-Zentrum Dresden-Rossendorf, Germany), and Dr. Dario Calvani (Helmholtz-Zentrum Dresden-Rossendorf, Germany). For the preparation of single-crystalline CVD graphene, he was supported by Prof. dr. Zhongfan Liu and Dr. Luzhao Sun (Beijing Graphene Institute, China).

In addition to his research activities, Guangya completed several academic training programs, including the Academic Writing and Scientific Conduct courses offered by the HRM Learning & Development department at Leiden University. He also participated in the Physical Methods in Inorganic Chemistry (PhMIC) course

from Holland Research School of Molecular Chemistry (HRSMC) in 2022, jointly organized by the University of Amsterdam, Leiden University, and Vrije Universiteit Amsterdam.

During the time at Leiden University, Guangya also served as a member of the Leiden Science China (LSC) community. He helped organize a variety of events, such as the L.U. Open Badminton Competition, the Chinese New Year Celebration, and the first six sessions of the LSC Roundtable π -Informal Presentation series.

His doctoral research has been presented at national and international conferences and symposiums as listed below:

- Chem2Dmat, 2021, online.
- CHAINS 2022, 2022, Veldhoven, the Netherlands.
- Graphene 2023, 2023, Manchester, United Kingdom (**Poster Prize**).
- IUPAC|CHAINS 2023, Den Haag, the Netherlands.
- CHAINS 2024, 2024, Veldhoven, the Netherlands.
- Kroese-Duijsters Symposium 2024, 2024, Leiden, the Netherlands.

After his PhD he will continue his postdoctoral research at the Leiden Institute of Chemistry, Leiden University.

List of publications

- [1] G. Schneider, W. Zhang, M. Makurat, X. Liu, X. Liu, Y. Li, T. Kock, A. Jiao, **G. Jiang**, C. Leist, C. Maheu, H. Sezen, D. Calvani, I. Eren, F. Buda, H. Qi, X. Feng, T. Heine, A. Kuc, J. Hofmann, U. Kaiser, L. Sun, L. Jiang, Z. Liu, Sulfophenylated centimeter-size graphene membrane in a direct methanol fuel cell, PREPRINT (Version 1) available at Research Square (2024).
<https://doi.org/10.21203/rs.3.rs-4807293/v1>.
- [2] N. Anwar[#], **G. Jiang**[#], Y. Wen, M. Ahmed, H. Zhong, S. Ao, Z. Li, Y. Ling, G. F. Schneider, W. Fu, Z. Zhang, Evaluating the potential of two-dimensional materials for innovations in multifunctional electrochromic biochemical sensors: a review. *Moore and More* **1**, 12 (2024).
- [3] Z. Li, E. Tian, S. Wang, M. Ye, S. Li, Z. Wang, Z. Ma, **G. Jiang**, C. Tang, K. Liu, J. Jiang, Single-atom catalysts: promoters of highly sensitive and selective sensors. *Chem Soc Rev* **52**, 5088–5134 (2023).
- [4] Z. Li, **G. Jiang**[#], Y. Wang, M. Tan, Y. Cao, E. Tian, L. Zhang, X. Chen, M. Zhao, Y. Jiang, Y. Luo, Y. Zheng, Z. Ma, D. Wang, W. Fu, K. Liu, C. Tang, J. Jiang, Detecting residual chemical disinfectant using an atomic Co-N_x-C anchored neuronal-like carbon catalyst modified amperometric sensor. *Environ Sci Nano* **9**, 1759–1769 (2022).
- [5] J. Zhang, F. Lv, Z. Li, **G. Jiang**, M. Tan, M. Yuan, Q. Zhang, Y. Cao, H. Zheng, L. Zhang, C. Tang, W. Fu, C. Liu, K. Liu, L. Gu, J. Jiang, G. Zhang, S. Guo, Cr-doped Pd metallene endows a practical formaldehyde sensor new limit and high selectivity. *Adv Mater* **34**, 2010563 (2021).
- [6] Y. Huang, S. Yin, Y. Huang, X. Zhang, W. Zhang, **G. Jiang**, H. Zhu, C. Wan, W. Fu, Graphene oxide/hexylamine superlattice field-effect biochemical sensors. *Adv Funct Mater* **31**, 2010563 (2021).

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- [7] Z. Li, Y. Yuan, H. Wu, X. Li, M. Yuan, H. Wang, X. Wu, S. Liu, X. Zheng, M. Kim, H. Zheng, S. Rehman, **G. Jiang**, W. Fu, J. Jiang, Investigation of MOF-derived humidity-proof hierarchical porous carbon frameworks as highly-selective toluene absorbents and sensing materials. *J Hazard Mater* **411**, 125034 (2021).
- [8] **G. Jiang**, H. Tian, Y.-C. Zhang, R.-K. Zheng, Y.-C. Qiao, S. Yang, Y. Yang, T.-L. Ren, “A spectrum-tunable and flexible light-emitting device with ultra-wide wavelength range” in *2020 4th IEEE Electron Devices Technology & Manufacturing Conference (EDTM)*, 1–4 (2020).
- [9] Y. Qiao, Y. Wang, J. Jian, M. Li, **G. Jiang**, X. Li, G. Deng, S. Ji, Y. Wei, Y. Pang, Q. Wu, H. Tian, Y. Yang, X. Wu, T.-L. Ren, Multifunctional and high-performance electronic skin based on silver nanowires bridging graphene. *Carbon* **156**, 253–260 (2020).
- [10] **G. Jiang**, H. Tian, X.-F. Wang, T. Hirtz, F. Wu, Y.-C. Qiao, G.-Y. Gou, Y.-H. Wei, J.-M. Yang, S. Yang, Y. Yang, T.-L. Ren, An efficient flexible graphene-based light-emitting device. *Nanoscale Adv* **1**, 4745–4754 (2019).
- [11] Y. Wei[#], Y. Qiao[#], **G. Jiang[#]**, Y. Wang[#], F. Wang, M. Li, Y. Zhao, Y. Tian, G. Gou, S. Tan, H. Tian, Y. Yang, T.-L. Ren, A wearable skinlike ultra-sensitive artificial graphene throat. *ACS Nano* **13**, 8639–8647 (2019).
- [12] G.-Y. Gou, M. L. Jin, B.-J. Lee, H. Tian, F. Wu, Y.-T. Li, Z.-Y. Ju, J.-M. Jian, X.-S. Geng, J. Ren, Y. Wei, **G.-Y. Jiang**, Y. Qiao, X. Li, S. J. Kim, M. Gao, H.-T. Jung, C. W. Ahn, Y. Yang, T.-L. Ren, Flexible two-dimensional Ti₃C₂ MXene films as thermoacoustic devices. *ACS Nano* **13**, 12613–12620 (2019).
- [13] J. Ling, Y.-H. Wei, **G.-Y. Jiang**, Y.-Q. Chen, H. Tian, Y. Yang, T.-L. Ren, “Piezoelectric micromachined ultrasonic transducers for ultrasound imaging” in *2018 IEEE International Conference on Electron Devices and Solid State Circuits (EDSSC)*, 1–2 (2018).