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Chemical functionalization of the graphene surface for electrical and electrochemical sensing applications

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Curriculum Vitae

Lin Jiang was born in Rizhao, Shandong province, China, on September 16th in 1988. In 2007, she graduated from Rizhao Experimental High School and enrolled as a bachelor student in marine science at Qingdao University of Science and Technology. In 2011, Lin graduated with her thesis entitled "Recycling and utilization of purified terephthalic acid" under the supervision of Prof. Dr. Kongcheng Hu. Lin continued her master study at Shanghai University under the supervision of Prof. Dr. Yaping Ding. Her research program focused on the fabrication of electrochemical biosensors based on novel graphene nanocomposites. As a master student, Lin received the "National Scholarship" and "Elite Student" Award from Shanghai University.

In 2014, Lin was granted a Chinese Scholarship Council scholarship (L.J., 201406890016) to start her PhD studies in the research group of Dr. Grégory F. Schneider in the department of Supramolecular & Biomaterials Chemistry (SBC) at Leiden University. During her PhD study, Lin collaborated with Dr. Yuvraj Birdja and Prof. Dr. Marc T. M. Koper on the electrochemical activity of hydrogenated graphene. With Bas van Dijk, M.Sc. and Dr. Dennis G. H. Hetterscheid, Lin further expanded her knowledge on the electrocatalysis of oxygen reduction reaction (ORR) using nitrogenated graphene. She also collaborated with Dr. Jiao and Prof. Dr. Harold Linnartz, Laboratory Astrophysics of Leiden University, as well as with Dr. Longfei Wu and Dr. Jan P. Hofmann, Eindhoven University of Technology, on the surface chemistry of graphene. In 2019, Lin was selected as a young editorial board of Chinese Chemical Letter (CCL, IF = 3.839). Lin was the co-founder of the Leiden Science China community, a student association in Leiden University aiming at strengthening connections between international students.

The results reported in this thesis were presented at several national and international conferences as listed below:

- NWA startimpuls workshop, Den Haag, the Netherlands, ***invited talk*** (13 September 2019).
- KNCV Electrochemistry Symposium, Groningen, the Netherlands, ***invited talk*** (23 November 2018).
- Graphene Week 2017, Athens, Greece, ***contributing talk*** (25-29 September 2017).
- Young Scholars Forum of Sun Yat-Sen University 2017, Guangzhou, P.R. China, ***invited talk*** (16-18 June 2017).

- 1st European Conference on Chemistry of Two-Dimensional Materials (Chem2DMat), Strasbourg, France, ***contributing talk*** (22-26 August 2017).
- CHAINS Conference 2017, Veldhoven, the Netherlands, ***Best Poster Award*** (5-7 December 2017).
- CHAINS Conference 2016, Veldhoven, the Netherlands, ***poster*** (6-8 December 2016).
- CHAINS Conference 2015, Veldhoven, the Netherlands, ***poster*** (30 November-2 December 2015).

List of Publications

1. Quantum and electrochemical interplays in hydrogenated graphene.
Lin Jiang, Wangyang Fu, Yuvraj Y. Birdja, Marc T. M. Koper, Grégory F. Schneider, *Nature Communications,* 2018, 9(1), 793.

2. Contact angle measurement of free-standing square-millimeter single-layer graphene.
Anna V. Prydatko, Liubov A. Belyaeva, **Lin Jiang**, Lia M. C. Lima, Grégory F. Schneider, *Nature Communications*, 2018, 9 (1), 4185.

3. Liquids relax and unify strain in graphene.
Liubov A. Belyaeva, **Lin Jiang**, Jelger H. Risselada, Jeroen Methorst, Grégory F. Schneider, N*ature Communications*, in press (2020).

4. Effects of substrate and polymer encapsulation on CO_2 electroreduction by immobilized indium (III) protoporphyrin.
Yuvraj Y. Birdja, Rafael E. Vos, Tim A. Wezendonk, **Lin Jiang**, Freek Kapteijn, Marc T. M. Koper, *ACS Catalysis*, 2018, 8(5), 4420-4428.

5. Redox interconversion between Co^{III} thiolate and Co^{II} disulfide compounds.
Feng Jiang, Maxime A. Siegler, Xiaobo Sun, **Lin Jiang**, Celia Fonseca Guerra, Elisabeth Bouwman, *Inorganic Chemistry*, 2018, 57(15), 8796-8805.

6. Sensing at the surface of graphene field-effect transistors.
Wangyang Fu, **Lin Jiang**, Erik P. van Geest, Lia M. C. Lima, and Grégory F. Schneider, *Advanced Materials*, 2017, 29(6), 1603610.

7. Rupture index: A quantitative measure of sub-micrometer cracks in graphene.
Hadi Arjmandi-Tash, **Lin Jiang**, Grégory F. Schneider. *Carbon*, 2017, 118, 556-560.

8. Graphene-stabilized lipid monolayer heterostructures: a novel biomembrane superstructure.
Lia M. C. Lima, Wangyang Fu, **Lin Jiang**, Alexander Kros, Grégory F. Schneider, *Nanoscale*, 2016, 8(44), 18646-18653.

9. Determination of isoniazid content via cysteic acid/graphene modified glassy carbon electrode.
Xiaojing Si, **Lin Jiang**, Xinyue Wang, Yaping Ding, Liqiang Luo, *Analytical Methods*, 2015, 7(2), 793-798.

10. Electrodeposited nitrogen-doped graphene/carbon nanotubes nanocomposite as enhancer for simultaneous and sensitive voltammetric determination of caffeine and vanillin.
Lin Jiang, Yaping Ding, Feng Jiang, Li Li, Fan Mo, *Analytica Chimica Acta*, 2014, 833, 22–28.

11. Facile and novel electrochemical preparation of a graphene-transition metal oxide nanocomposite for ultrasensitive electrochemical sensing of acetaminophen and phenacetin.
Lin Jiang, Shuqing Gu, Yaping Ding, Feng Jiang, Zhen Zhang, *Nanoscale,* 2014, 6(1), 207–214.

12. Mild and novel electrochemical preparation of β-cyclodextrin/graphene nanocomposite film for super-sensitive sensing of quercetin.
Zhen Zhang, Shuqing Gu, Yaping Ding, Mingju Shen, **Lin Jiang**, *Biosensors and Bioelectronics*, 2014, 57, 239-244.

13. A novel nonenzymatic fructose sensor based on electrospun $LaMnO_3$ fibers.
Duo Xu, Liqiang Luo, Yaping Ding, **Lin Jiang**, Yuting Zhang, Xiaoqian Ouyang, Bingdi Liu, *Journal of Electroanalytical Chemistry*, 2014, 727, 21-26.

14. Amperometric sensor based on tricobalt tetroxide nanoparticles–graphene nanocomposite film modified glassy carbon electrode for determination of tyrosine.
Lin Jiang, Shuqing Gu, Yaping Ding, Daixin Ye, Zhen Zhang, Fenfen Zhang, *Colloids and Surfaces B: Biointerfaces*, 2013, 107, 146-151.
15. Oxygen reduction reaction on nitrogen-doped graphene activated by co-doped oxygen functional groups.
Lin Jiang, Bas van Dijk, Longfei Wu, Jan P. Hofmann, Viorica Tudor, Marc T. M. Koper, Dennis G. H. Hetterscheid, Grégory F. Schneider, submitted.

16. Hydrogenation cleans up airborne contamination from graphene.
Lin Jiang, Pauline M.G. van Deursen, Hadi Arjmandi-Tash, Liubov A. Belyaeva, Haoyuan Qi, Jiao He, Vincent Kofman, Longfei Wu, Valerii Muravev, Ute Kaiser, Harold Linnartz, Emiel J.M. Hensen, Jan P. Hofmann, Grégory F. Schneider, submitted.

17. Biaxial compression of centimetre-scale graphene.
Hadi Arjmandi-Tash, Hessam Sokooti, Khosrow Shakouri, **Lin Jiang**, Alexander Kloosterman, Marius Staring, Lia M.C. Lima, Grégory F. Schneider, submitted.

18. Hydrogenated and nitrogenated graphene for field effect gas sensing.
Lin Jiang, Wangyang Fu, Elisabeth Bouwman, Grégory F. Schneider, in preparation.

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