Surface Engineering for Molecular Electronics

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Propositions

accompanying the dissertation

SURFACE ENGINEERING FOR MOLECULAR ELECTRONICS

by

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1. Large-area junctions and single-molecule junctions are two complementary approaches designed to tackle specific and different challenges in molecular electronics, the former examines molecules as ensembles in their equilibrium state, ensuring a more reliable device performance than the latter. (Chapter 1)
2. Atomic force microscopy is a powerful tool for the characterization of molecular self-assemblies beyond their surface morphology. (Chapter 2)
3. Disagreement in scientific observations and conclusions should be discussed, not overlooked. (*J. Am. Chem. Soc.* 2019, 141, 497-504 and Chapter 2)
4. The orientation and stability of light-harvesting proteins are crucial to the performance of biophotovoltaic devices. (Chapter 3)
5. The combination of single-molecule junctions and large-area junctions provides more insight into the orientation and charge transport through self-assembled biocomplexes than any of the techniques alone. (Chapter 3)
6. Self-assemblies of glycol ethers are drop-in replacements for thiolate self-assembled monolayers that retain all of their useful properties while avoiding the drawbacks of metal-thiolate bonds. (Chapter 4)
7. Molecular tunneling junctions that reconfigure during operation convert stochastic data encoded in chemical packets to solid-state memory, opening opportunities for useful molecular electronic computation. (Chapter 5)
8. In the realm of quantum tunneling, one Ångström makes a difference. (Chapter 6)
9. The power that creates the future of science lies in our hands.
10. Do not be afraid of challenges, be they in life or science. They only become easier as we keep moving forward.

These propositions are regarded as opposable and defendable, and have been approved as such by the promotors Prof. Dr. Ryan C. Chiechi and Prof. Dr. Andreas Herrmann.