Evolution of Au(111) electrode surface in different electrolytes and conditions studied with a home-made EC-STM

Behjati, S.

List of publications

1. Saeid Behjati and Marc T. M. Koper. In situ STM study of roughening of Au(111) single-crystal electrode in sulfuric acid solution during oxidation–reduction cycles. The Journal of Physical Chemistry C, 128(44):19024–19034, 2024.

2. Saeid Behjati and Marc T. M. Koper. Effect of trace amounts of chloride on roughening of Au(111) single-crystal electrode surface in sulfuric acid solution during oxidation–reduction cycles. ACS Electrochemistry 1 (7), 1082-1092, 2025.

3. Saeid Behjati, Mojtaba Hajilo, Maximilian Albers, and Marc T. M Koper. Anisotropic Roughening of a Au(111) Single-Crystal Electrode Surface in $HClO_4$ Solution during Oxidation–Reduction Cycles. J. Phys. Chem. C, 129(19), 8915–8926, 2025.

4. Ariba Adnan, Saeid Behjati, Núria Félez-Guerrero, Kasinath Ojha, and Marc T. M. Koper. Tracking the surface structure and the influence of cations and anions on the double-layer region of a Au(111) electrode. Phys. Chem. Chem. Phys. 26(32):21419-21428, 2024.

5. Zahra Sharifi, Saeid Behjati, Jacques H.O.J. Wijenberg, Arnoud C.A. de Vooys, and Marc T.M. Koper. Mechanism of Cr(III)-based oxide-hydroxide film electrodeposition in an acidic solution. Electrochimica Acta, 512:145451, 2025.

Curriculum vitae

Saeid Behjati was born in Iran (Tehran) in August 1991. He went through elementary and middle school while developing his early interests in electronics. During his high school years, he developed some interest in mechanics as well. Thus, he decided to continue his study for a bachelor program in solid state physics (2009–2014) at KNTU providing a quantitative grounding for his multidisciplinary interests. Later, as a master's candidate in Photonics (2014–2016) at SBU, during his Master's Project, he designed and fabricated a multichannel plasmonic absorber, combining advanced optical simulation with precision micro-fabrication. From June 2017 to September 2019, he served as an Instrument Developer, designing, manufacturing, and assembling a dynamic balance machine compliant with ISO 1940-1. He developed mechanical components (SolidWorks/CNC), electrical modules for vibration sensors, tachometers, encoders, and FPGA-based control systems programmed in VHDL. He also developed software for real-time motor control, data acquisition, signal processing, and automated report generation.

Subsequent to finalizing the previous project, he started looking for a more challenging and fun project to accomplish. An open position at Leiden University caught his eye, and the requirements of the projects fit very nicely with his background. Hitting COVID caused a long delay in the project's start date, and he finally started the project in 2020 with all COVID-related limitations. Due to the final goal of the project and unpredictable challenges during the first year of his PhD, he decided to develop a new electrochemical scanning tunneling microscope (EC-STM) in the chemistry department of Leiden University, which satisfies all the technical needs toward the goals. After two years of hard work and perseverance, the first successful experiment was conducted and the instrument became available for serious experiments. The study of Au(111) roughening in different electrolytes led to many new findings for the rest of his time as a PhD candidate.

During his PhD, Saeid actively engaged in professional development courses and workshops such as Effective Communication, Planning and Managing Your PhD, and Scientific Conduct for PhDs. Alongside his research, he also found fulfillment in teaching, supervising two bachelor internship students and one master's thesis student in their respective projects.

He presented his research work at local and international conferences, including Reedijk Symposium 2023 at Leiden university, the International Society of Electrochemistry (ISE) Annual Meeting in 2023 and 2024, the Netherlands' Catalysis and Chemistry Conference (NCCC) in 2024 and 2025.

Saeid
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I also extend my sincere thanks to my teammates in CASC and colleagues in FMD, and ELD, for their invaluable collaboration and support. Their assistance greatly enriched this journey and contributed to the success of my experiments.

Finally, I express my heartfelt gratitude to my family and friends, whose love, patience, and encouragement provided the strength to persevere through this endeavor.