(Thermo-)Capillary effects on gas bubbles generated at electrodes

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Abstract

Electrolytic gas evolution is a fundamental phenomenon occurring in a large number of industrial applications. Promoting the bubble departure is often beneficial for different reasons, but requires a detailed understanding of the bubble dynamics. Only recently, capillary effects were firstly discussed at microelectrodes where the interface of the attached bubble was found to move [1]. Such Marangoni flow originates from a gradient of the surface tension along the gas-liquid interface which, in electrolysis, may arise from thermal, solutal or electrical effects. By combining numerical and experimental efforts, the presentation discusses these effects in detail in order to clarify the origin of the flow at microelectrodes [2]. Furthermore, the relevance of the thermocapillary effect at large planar electrodes and the related force on the bubble are discussed.

References

[1] X. Yang et al, *Phys. Chem. Chem. Phys.* 20 (2018) 11542-11548.
[2] J. Massing et al., *Electrochim. Acta*. 297 (2019) 929-940.

Biographical sketch

- Diploma in Physics at TU Dresden 1989
- PhD in Mech. Eng. (Fluid Dynamics) at TU Dresden 2013

- 1992-2008 Research Assistant at Forschungszentrum Rossendorf, Institute of Safety Research
- 2009-2012 Research Assistant at TU Dresden, Institute of Fluid Dynamics
- Since 2013 – Senior Researcher at HZDR, Institute of Fluid Dynamics, Assistant to the Director
- 2013-2017 Manager of the LIMTECH-Helmholtz-Alliance

- Research Interests: Magnetohydrodynamics, Electrochemical and multiphase problems, Numerical modeling

- Current projects: Capillary effects in electrolytic gas evolution; magnetic field assisted electrodeposition of structured metal layers; magnetic field assisted separation and purification in aqueous solutions