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On a carpet of microbubbles existing beneath the hydrogen bubbles growing at a microelectrode[1] ALEKSANDR BASHKATOV, SYED SAHIL HOSSAIN, YANG XUEGENG, GERD MUTSCHKE, KERSTIN ECKERT, Institute of Fluid Dynamics, Helmholtz-Zentrum Dresden-Rossendorf, Bautzner Landstr. 400, 01328 Dresden, GERMANY — Recently, a carpet of microbubbles existing beneath the hydrogen bubble growing at 100 μm microelectrode during water electrolysis was revealed. It was found that the bubble growth is mainly governed by coalescence with this microlayer while the thickness of that increases along with the bubble evolution. The carpet thickness depends sensitively on potential and electrolyte concentration. Upon increasing both parameters, the carpet thickness reduces and a transition from monotonic to oscillatory growth is observed. The oscillatory phenomenon consists of a periodic detachment and reattachment of the bubble while the thickness of the carpet is oscillating in time. During the oscillations, the amplitude and the carpet thickness rise until a critical value is reached, leading to bubble detachment. Although the electric force F_e was shown to be a responsible restoring force, the bubble-carpet interaction needs further consideration. Additionally to that, during recent microgravity experiments in a parabolic flight, a similar behavior was noticed.

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