Selforganization on electrode surfaces

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Complex forms of organization are often the result of nonlinear interactions between their basic building blocks. As a consequence, the system's properties cannot be explained by extrapolating knowledge about the molecular structure of the components which build up the system. Rather, in addition, information about their mutual interactions is required. Examples for such organization forms range from physical systems, such as the formation of filament clusters in gas discharge tubes or spiral galaxies, over materials science, where, e.g., the spontaneous ordering of nano-scale layers during the co-deposition of different metals is observed, to chemical and biochemical systems, where pattern formation during CO oxidation or glycolytic oscillations, respectively, are prominent examples.

In the talk I will discuss basic principles that govern the formation of patterns at the solid-liquid interface. It will be demonstrated that self-organization phenomena are wide-spread in electrode reactions. The examples discussed in more detail focus on electrochemical reactions of technical importance, such as the electrooxidation of CO on Pt electrodes, one of the most important electrocatalytic reactions, and the electrodissolution of Si in flouride-containing electrolytes.