

High frequency periodic forcing of oscillatory catalytic CO oxidation on Pt (110)

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Periodic forcing of oscillating systems can be observed in phenomena as diverse as the human heartbeat, circadian rhythm, or tidal currents. Such systems can be considered as periodically forced nonlinear oscillators. Depending on the amplitude and the frequency of the external force, the oscillator may become entrained to the external stimulus and exhibit phase locked domains separated by fronts [1][2]. Oscillatory catalytic CO oxidation on platinum [3] can be externally forced by applying periodic variations to the partial pressures of reactants in the chamber. In the present work, we introduce a new experimental setup that allows for the first time to impose high forcing frequencies to such a system; here are presented the results of modulating CO pressure with a 2:1 and 3:1 resonant forcing frequencies. Phase locked regimes, formation of clusters, and four-phase intermittent turbulence arose.

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