Electric field, power and reactive species in a surface dielectric barrier discharge for plasma catalysis

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Plasma catalysis aims at a synergy between low-temperature plasma chemistry and catalytic surface reactions. However, due to the complexity and number of species involved, it is extremely difficult to identify the processes relevant to the synergistic effect of plasma catalysis. In order to gain a fundamental understanding and isolate relevant processes, we use a customized surface dielectric barrier discharge that allows the integration of catalysts, targeted parameter variations and optimal optical access. Here, we concentrate on the gas phase and present results of electric field measurements using Stark splitting and shifting and its influence on the reactive species generated in the discharge as a function of absorbed power. Finally, we demonstrate a proof of concept for plasma catalysis.