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Influence of applied voltage amplitude on chemical reaction locus in a plasma-enhanced packed bed reactor[1] ZAKA-UL-ISLAM MUJAHID, Jazan University, Ruhr-University Bochum, MOHAMMED OTEEF, Jazan University, AHMED HALA, KACST, XIN TU, University of Liverpool, JULIAN SCHULZE, Ruhr-University Bochum, Dalian University of Technology — Plasma enhanced packed bed reactors (PE PBR) are promising for VOC abatement applications. Previous studies have reported that applied voltage (or power) is an important parameter with regards to PR PBR's performance. However, the origin of this change in performance is not well understood. PE PBR has multiple micro and mesoscopic voids/cavities where the plasma is generated. The ICCD images showed that the plasma emission position changes with the applied voltage amplitude. The reactants and the products in a PE PBR are typically in gaseous or in liquid form, and therefore the position of the chemical reactions in the cavity could not be studied. In this work, we have tailored operating conditions to enhance the production of solid or liquid products deposited at the location of the chemical reaction. It was found that the chemical reactions happened predominantly at the position of plasma emission in these conditions. Similar to the plasma emission, the reactive species deposition position changes with the applied voltage amplitude. The analysis of the expected reactive species life times, reaction products and deposition location indicate that short duration species such as OH and O possibly play an important role in VOC conversion.

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