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On the influence of ferroelectric components in dielectric barrier discharge plasmas

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In this work we have analysed the removal of four contaminants in air (methane, acetone, chloroform and toluene) by using different configurations of a packed-bed parallel plate DBD reactor [1]. In particular, we have focused on the influence that both the electrode size and the incorporation of a ferroelectric plate to the pellet barrier have on the process efficiency. Influence of other parameters such as the residence time or the electrical operating conditions have also been analysed. The obtained results show enhanced efficiencies for the smaller electrode reactor modified with the ferroelectric plate. For the different configurations, a detailed analysis of the electron density, the electric field and the electron energy distribution suggests that improvements in the efficiency of plasmas can be attributed to a higher energy of the generated plasma electrons. Electrical characterization reveals that lower capacitance system reactor favours the efficiency of the plasma for removal processes.
[1] Gómez-Ramírez, A.; Cotrino. J.; Lambert, R. M.; González-Elipe, A. R. Plasma Sources Sci. Technol. 2015, 24 (6), 065011–65017.

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