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Design of experiment analysis of CO_2 dielectric barrier discharge conditions on CO production[1] MARKUS BECKER, INP Greifswald, 17489 Greifswald, Germany, SRINATH PONDURI, Dutch Institute for Fundamental Energy Research, 5612 AJ Eindhoven, The Netherlands, RICHARD ENGELN, Eindhoven University of Technology, 5600 MB Eindhoven, The Netherlands, RICHARD VAN DE SANDEN, Dutch Institute for Fundamental Energy Research, 5612 AJ Eindhoven, The Netherlands, DETLEF LOFFHAGEN, INP Greifswald, 17489 Greifswald, Germany — Dielectric barrier discharges (DBD) are frequently used for the generation of CO from CO_2 which is of particular interest for syngas production. It has been found by means of fluid modelling in [1] that the CO_2 conversion frequency in a CO_2 DBD depends linearly on the specific energy input (SEI) while the energy efficiency of CO production is only weakly dependent on the SEI. Here, the same numerical model as in [1] is applied to study systematically the influence of gas pressure, applied voltage amplitude and frequency on the CO_2 conversion frequency and the energy efficiency of CO production based on a 2-level 3-factor full factorial experimental design. It is found that the operating conditions of the CO_2 DBD for CO production can be chosen to either have an optimal throughput or a better energy efficiency.

[1] S. Ponduri, et al., *J. Appl. Phys.* **119** (2016) 093301

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