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**The gas conversion of methane with oxygen at atmospheric pressure using a cylindrical dielectric barrier discharge** TOM MARTENS, DRAGANA PETROVIC, CHRISTOPHE DE BIE, ANNEMIE BOGAERTS, Research Group PLASMANT, Department of Chemistry, University of Antwerp, WOUTER BROK, JAN VAN DIJK, Department of Applied Physics, Eindhoven University of Technology — The conversion of methane to useful chemicals and liquid fuels currently requires steam reforming, which requires great amounts of energy input. We are currently investigating the possibilities of using a plasma activated system for this gas conversion. Due to the pulsed nature and the low operating temperature capabilities, we have chosen the atmospheric pressure dielectric barrier discharge as a setup to investigate whether it can be used as a more efficient gas conversion reactor. For this purpose we have developed a  $\text{CH}_4/\text{O}_2$  chemical reaction set and used it in a 2D fluid model of a cylindrical dielectric barrier discharge, in which we also incorporate the influence of the gas flow. In this way we investigate whether we can optimize the production of methanol or formaldehyde. The parameters under study are the  $\text{CH}_4/\text{O}_2$  ratio, the applied voltage characteristics, the gap width and the gas flow rate.

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