Abstract Submitted
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CH_4-CO_2 reforming in surface DBD reactor with ZnO-Cu and NiO catalysts[1] CLAUDIA LAZZARONI, ABDELKADER RAHMANI, MEHRDAD NIKRAVECH, LSPM-CNRS, Institut Galilée, Université Sorbonne Paris Cité, Université Paris 13, MP4 TEAM — Dry reforming of methane (CH_4) is carried out in an atmospheric pressure Dielectric Barrier Discharge (DBD) reactor. The two 3 mm thickness aluminum electrodes are separated by a 3 mm thickness dielectric sheet made of quartz. The electrodes present 3 branches and the space between two adjacent branches is filled with beads of catalyst which are 2 mm diameter alumina beads coated with ZnO-Cu or NiO. The coating is performed in two different ways: (i) by impregnation and (ii) by fluidized spray plasma. A 30 kHz and several kV AC voltage is applied to the electrodes. The feedstock gas is a mixture of argon, carbon dioxide (CO_2) and methane with individual fluxes varying from 20 to 80 mL/min. At the reactor outlet, the gas goes through a condenser at 4°C to condense liquid products. The reforming reaction products are identified by liquid and gas phase chromatography. The effect of the applied power and the catalyst nature on the product distribution is studied. Whatever the catalyst, the conversion rate of CH_4 and CO_2 increases with the applied power while the selectivity of gas products is almost independent of the power. The condensed liquids collected under our experimental conditions, such as ethanol or acetic acid, represent more than 10% of the products.

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