Abstract Submitted
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Conversion of carbon dioxide to carbon monoxide using non-thermal radio-frequency microplasmas at atmospheric pressure[1] JAMES DEDRICK, York Plasma Institute, University of York, JAMES COMERFORD, Green Chemistry Centre of Excellence, University of York, ZAENAB ABD-ALLAH, Now at the University of Liverpool, KARI NIEMI, DEBORAH O'CONNELL, York Plasma Institute, University of York, MICHAEL NORTH, Green Chemistry Centre of Excellence, University of York, TIMO GANS, York Plasma Institute, University of York — The conversion of carbon dioxide to carbon monoxide using non-thermal plasmas offers the potential to provide a sustainable and efficient source of carbon monoxide that is widely used in industry. To maximise conversion efficiency, a non-thermal microplasma source is developed to operate at 40.68 MHz in helium while minimising the potential for arcing. Operation in argon is also achieved and this offers the possibility for the future upscaling of production. Measurements of the concentration of carbon monoxide in the effluent are undertaken using Fourier transform infrared spectroscopy and combined with electrical measurements to estimate the efficiency of conversion with respect to variations in the applied voltage and inlet gas composition. The production of carbon monoxide concentrations greater than 1000 ppm (using a 1% carbon dioxide admixture in helium) facilitates the use of this method for simple chemical reactions including the generation of carbonyl functionalised molecules.

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