Plasma chemistry as a tool for nitrogen fixation\textsuperscript{1} MILES TURNER, Dublin City University, Ireland — Nitrogen fixation is an outstanding problem of the 21st century, because the nitrate fertiliser produced by fixation is essential to agricultural productivity, but present techniques involve fossil fuel consumption with corresponding greenhouse gas emissions. A plausible alternative is a plasma process powered by renewable energy sources such as wind or solar power. Such a process aims to transform atmospheric oxygen and nitrogen initially into nitrogen oxides. The challenge is to design a process with high energy efficiency and the potential to scale to large capacity. This paper describes progress in modelling and relevant plasma chemistry and identifying the optimal conditions for operating a process. In simulation, energy efficiencies comparable to the conventional process can be achieved. The limitations of the model will be discussed, with reference to the uncertainty caused by uncertain rate constants.

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