

Abstract Submitted
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Plasma chemistry as a tool for nitrogen fixation¹ 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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