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(54) Title: RENEWABLE POWER TO X MODULE BASED ON OZONATION ASSISTED ELECTROCHEMICAL ENERGY CONVERSION REACTION

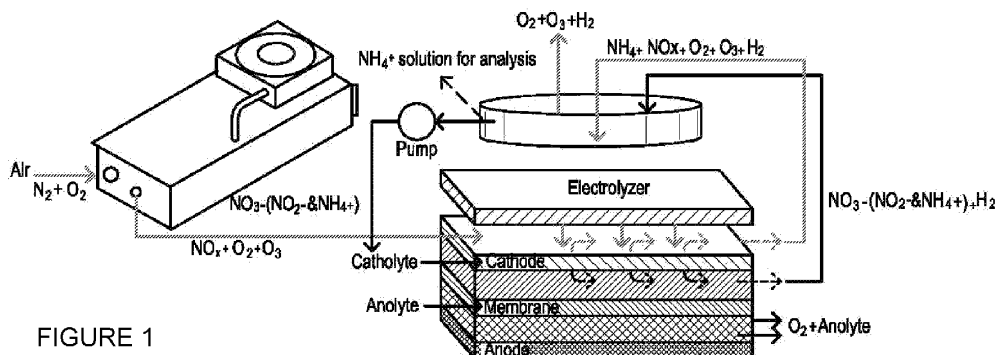


FIGURE 1

(57) Abstract: Methods for producing ammonia and/or ammonium comprising: i) ozonation of air to produce a product gas stream comprising ozone and gaseous NO_x species, or using a waste stream comprising gaseous NO_x species; and ii) electrolytically reducing the gaseous NO_x species by passage from a gas side of a gas diffusion electrode to a catholyte thereby to produce NH₄⁺ or NH₃; and wherein the gas diffusion electrode comprises a metal/metal oxide single atom or dual atom catalyst electrode. Also, apparatus for carrying out the method, for example an ozone generator; and an electrolyser wherein the output of the ozone generator is fed to a catholyte of the electrolyser via a gas diffusion electrode.

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