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CO_2 remediation using high power electron beams. TZVETELINA PETROVA, GEORGE PETROV, Naval Research Laboratory, JOHN APRUZESE, Engility Corp. , Chantilly, VA, MATTHEW WOLFORD, Naval Research Laboratory — To mitigate increasing CO_2 concentrations in the atmosphere and alleviate global warming, we investigated a method of CO_2 reduction using high-power electron beams. A series of experiments were conducted in which the reduction of CO_2 is measured for different gas compositions and power deposition rates [1]. Electron beam irradiation of gas containing 90% CO_2 and 10% CH_4 at beam energy density deposition of 4.2 J/cm^3, reduced the CO_2 concentration to 78%. Analogous experiments with a gas mixture containing 11.5% CO_2, 11.5% CH_4 and balance of Ar, reduced the CO_2 concentration to below 11% with energy deposition 0.71 J/cm^3. An electron beam deposition model computed the energy cost for breaking a CO_2 molecule in flue gas (82% N_2, 6% O_2 and 12% CO_2) to be 85 eV per molecule [1]. Other techniques to enhance the removal of CO_2 with pulsed electron beams are also explored, yielding new possible avenues of research. [1] G. M. Petrov, J. P. Apruzese, Tz. B. Petrova, and M. F. Wolford, J. Appl. Phys. **119**, 103303 (2016).

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