Carbon (IV) Oxide Electro-Reduction Process to Curb Effects of Global Warming

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In our society today the adverse effects of climate change brought about by the release of green house gases such as carbon (IV) oxide are already being felt. Carbon (IV) oxide electro-reduction research was driven by the desire to reduce reliance on fossil fuels and lower green house gas emission. This research uses the knowledge of electrolysis as the foundation, to find acceptable materials and fabricate a cell able to produce alkanols and other organic compounds directly from reduction of carbon (IV) oxide.The initial part of this study focused on electrolyte materials in order to identify a promising electrolyte to be implemented in the full cells. One molar solution of the sulphate, carbonate and nitrate of sodium and potassium were investigated.The temperature of each electrolyte was maintained at 80 to 85 degrees Celsius. Porous iron, copper granules and graphite granules were investigated at the cathode. The rate of electro-reduction and the composition of the products were investigated. 200 milliliters of 2molar hydrochloric acid was reacted with 30 grams of calcium carbonate to produce carbon (IV) oxide that was reduced at the cathode. Potentiometer was used to stabilize current and voltage was recorded in triplicates. Sodium sulphate was the best electrolyte when used with porous iron at cathode. Unusual peaks at 2.01 and 2.2 volts for sodium sulphate, and 1.5 volts for the nitrates were observed indicating reduction of carbon (IV) oxide. The products contained alkanols and carboxylic acids.The rate of electro-reduction was high at higher amounts of carbon(IV) oxide. The process can reduce the effects caused by emission of green house gases and also generate useful organic products. Further research to be done to characterize the products.

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