

Libya
Ministry of Higher Education
AL-Asmarya Islamic University
Faculty of Engineering



SIMULATION OF THE PROCESS OF CONVERTING CARBON DIOXIDE TO POLYCARBONATES USING ASPEN HYSYS SOFTWARE

**This graduation project is submitted to the Chemical Engineering Department
in partial fulfillment of the requirements for the degree of Bachelor of Science
in Chemical Engineering**

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ABSTRACT

This research revolves around the possibility of taking advantage of carbon dioxide. This message began with the conversion of carbon dioxide gas to polycarbonate. This is because carbon dioxide emissions (CO_2) have increased to unsustainable levels in the atmosphere, which has led to current environmental problems such as climate change and global warming. Reducing carbon dioxide emissions has become a global environmental challenge. One of the technological developments aimed at reducing carbon dioxide emissions into the atmosphere is the green chemical process of using carbon dioxide to manufacture valuable chemicals such as organic carbonates. The Hysys software was used to simulate this process so that the reaction of carbon dioxide (CO_2) and propylene oxide (PO) to propylene carbonate (PC) synthesis was successfully carried out in the CSTR reactor. As well as its effect on the conversion rate and some other parameters. It has been found that the increase in carbon dioxide temperature and pressure increases the carbon dioxide conversion and computer productivity. The results showed that increasing the reaction temperature above $150\text{ }^\circ\text{C}$ and CO_2 pressure to more than 200 kPa reduces computer productivity. The optimum reaction state was found at $50\text{ }^\circ\text{C}$, pressure 200Kpa CO_2 , and reactor volume 60 m^3 .

In this process, we remove approximately 39,700 tons per year from harmful carbon dioxide gas, at the same time we produce approximately 89,350 tons per year of polycarbonate of great interest.