

## Green Production of Dialkyl Carbamate Chemicals

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Big demand for polyurethane precursors such as dialkyl carbamate has motivated us to search for a clean and efficient route in the production of these chemicals. One promising route is to use diamine and selected carbonyl sources as reactants, because it does not involve the use of toxic phosgene chemicals and harsh reaction conditions. We have successfully synthesized 1,6-hexamethylene dicarbamate with 1,6-hexamethylene diamine as a diamine source and dimethyl carbonate as a carbonyl source. The reaction proceeded in excellent yields and selectivity at mild reaction conditions (e.g. 333 K and 1 atm) with homogeneous Bronsted base catalysts such as sodium methoxide. To scale up the process and investigate the economic feasibility, we have developed the conceptual process flow diagram and calculated the mass and energy balance of the process with SIMSCI Pro/II software and reaction kinetic results. The optimized process flow diagram and expected energy consumption for the process has also been estimated.