Direct synthesis of dimethyl carbonate from carbon dioxide and methanol

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Dimethyl carbonate (DMC) is an important raw material as it serves as a nontoxic substitute for dimethyl sulfate, dimethyl halides, and phosgene in methylation and carbonylation processes. It is also potentially a gasoline fuel additive, with three times the oxygen content of the commonly used MTBE. Several commercial processes have been developed for the synthesis of DMC, including methanolysis of phosgene, oxidative carbonylation of methanol and transesterification route. However, these processes involve the use of toxic, flammable, and corrosive gases, such as phosgene, hydrogen chloride, and carbon monoxide. Therefore, direct synthesis of DMC from carbon dioxide and methanol has recognized as a green chemical process for the synthesis of DMC. In this work, the base catalyzed synthesis of DMC was carried out in the presence of carbon dioxide. Effects of carbon dioxide pressure and the amount of promoter were investigated.