

### Kinetics of Dimethyl Carbonate Synthesis by Homogeneous Transesterification

Abimanyu Haznan, 안병성\*, 유계상  
한국과학기술연구원 반응매체연구센터  
(bsahn@kist.re.kr\*)

A comprehensive kinetic study on dimethyl carbonate (DMC) synthesis by transesterification reaction of ethylene carbonate (EC) with methanol has been conducted. An alkali base metal (KOH) was used as catalyst in the synthesis of DMC and its catalytic ability was investigated in term of kinetics. The experiments were conducted in a 200 ml autoclave in atmospheric pressure and at reaction temperature was varied from 30 °C to 60 °C and from 30 °C to 80 °C for forward and backward reaction. The molar ratio of the initial reactants for forward reaction (MeOH:EC) was in the range of 8:1 – 15:1, while for backward reaction the molar ratio between DMC and ethylene glycol was changed from 1:10 to 10:1. The reaction orders, the activation energy and the rate constants were determined for both forward and backward reactions. It has been found that the reaction order for forward and backward reactions are 0.87 and 2.15, respectively. The activation energy is 12.73 and 29.28 kJ/mol, and the rate constant is  $18.1 \exp(-12734.2/RT)$  and  $2457.5 \exp(-29276.6/RT)$  for forward and backward reactions, respectively. The reaction is reversible and the equilibrium rate constant was estimated to be  $135.77 \exp(-16542.4/RT)$ .