Organic Catalysis: Synthesis of Propylene Carbonate by the Carboxylation of Propylene Oxide in the Presence of Phenols and Fluorinated Alcohols

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Abstract—Phenol, polyphenols, as well as fluorinated alcohols actively catalyze the carboxylation of propylene oxide to form propylene carbonate in mild conditions (60°C, 7 at). The highest catalytic activity is characteristic of polyhydric phenols having neighbouring OH groups and alcohols with an enhanced acidity of OH protons. These catalysts in combination with tetrabutyammonium iodide exhibit activity at low concentrations (0.25 mol %) and ensure almost quantitative yields of propylene carbonate. The activity of the catalysts much increases with increasing ammonium salt amount (TOF up to 260), as well as temperature and initial CO_2 pressure (TON up to 370).

Keywords: propylene carbonate, propylene oxide carboxylation, phenol and fluorinated alcohol catalysts

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