



HYDROGENATION OF CO₂ PROMOTED BY A DUAL BASIC TASK-SPECIFIC IONIC LIQUID

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Conversion of CO₂ into valuable chemicals has attracted much attention in recent years. Hydrogenation of CO₂ to produce formic acid is an attractive route, and this reaction has been studied extensively. In our previous work, a tertiary amine functionalized IL has been used to promote hydrogenation of CO₂.¹ The IL is nonvolatile, the formic acid formed could be obtained simply by heating after reaction. In this work, two tertiary amines were connected to in imidazole ion and an IL two basic groups was synthesized. Using this IL and previously reported catalyst¹, the reaction was conducted at conditions in this work. The result showed that TOF of the reaction increased greatly as little water was added into the system, and the increase in reaction rate slowed down as more water was added. This may originate from the influence of water on viscosity of the IL. H₂ and CO₂ are the reactants of the reaction, increase of the pressure of H₂ and CO₂ resulted in increase in TOF. The result also showed that TOF increased greatly as increasing reaction temperature. When time of the reaction was long enough, the molar ratio of formic acid formed to the IL added reached 2:1, i.e., two moles of formic acid can be produced by one mole in one reaction cycle.

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Reference

1. Zhang, Z. F.; Xie, Y.; Li, W. J.; Hu, S. Q.; Song, J. L.; Jiang, T.; Han, B. X. *Angew. Chem. Int. Ed.* **2008**, 47(6), 1127.