Supplementary Information

Acetophenone hydrogenation over Pd catalyst in the presence of H_2O and CO_2

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Experimental procedure

A commercially available Pd/C catalyst (Wako Pure Chemical Ind. Ltd.) was used without further reduction. The metal dispersion value of palladium determined by a hydrogen adsorption method was 17%. The catalyst, acetophenone (Wako Pure Chemical Ind. Ltd.), and solvent were placed in a stainless-steel reactor (50 cm^3 capacity), which was then flushed with argon or carbon dioxide. After the required temperature was attained with an oil bath, first hydrogen and then carbon dioxide were introduced into the reactor to the desired pressure levels. Subsequently, the content was magnetically stirred. After the reaction period, the reactor was cooled down rapidly with an ice bath. The products was analyzed with a gas chromatograph (HP-6890) equipped with DB-WAX column and an FID detector. For the analysis of products of two-liquid system, the products and water in the reactor were mixed with acetone to form a homogeneous liquid, and analyzed with the gas chromatograph. The results showed a material balance of more

than 95%.

The reaction rates in Figure 4 were determined from the relation between reaction time and acetophenone conversion; several data points below acetophenone conversion of 20% were obtained as a function of reaction time, and the reaction rates were calculated from a gradient of acetophenon consumption with reaction time.