Supporting Information

Understanding the mechanism of the competitive adsorption in 8-methylquinoline hydrogenation over Ru catalyst

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The structure of the produced 4H-8-MQL from 8-MQL hydrogenation was determined by H^1 NMR, which was displayed in Figure S1. H^1 NMR (400 MHz, $CDCl_3$, 298k): δ 6.86 (d, J = 7.3 Hz, 1H), 6.83 (d, J = 7.5 Hz, 1H), 6.54 (t, J = 7.4 Hz, 1H), 3.37 - 3.34 (m, 2H), 2.77 (t, J = 6.4 Hz, 2H), 2.06 (s, 3H), 1.95 - 1.90 (m, 2H).

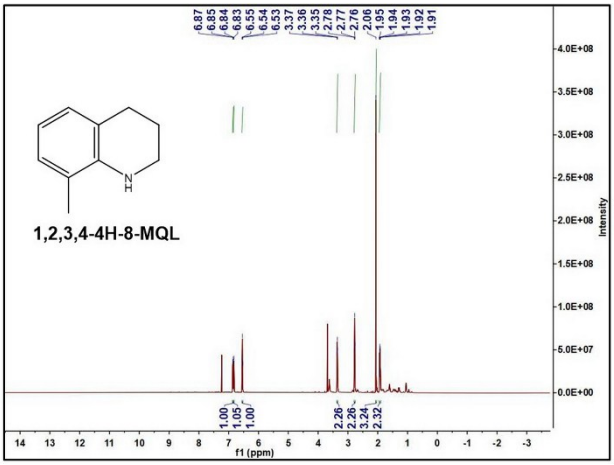

Figure S1. The structure of 4H-8-MQL detected by H^1 NMR.

The influences of temperature and pressure on hydrogenation rates of 8-MQL were investigated in detail. Figure S2 shows the mole fraction distributions for 8-MQL hydrogenation at 120 - 170 °C over Ru/Al_2O_3. The standard hydrogenation conditions designed in this experiment were: 0.2 g Ru/Al_2O_3 catalyst, 4 g 8-MQL, 40 ml dioxane and 7 MPa hydrogen pressure. Figure S3 shows mole fraction distributions for 8MQL hydrogenation under 4-9 MPa. The standard hydrogenation conditions were: 0.2 g Ru/Al_2O_3 catalyst, 4 g 8-MQL, 40 ml dioxane, 160 °C.

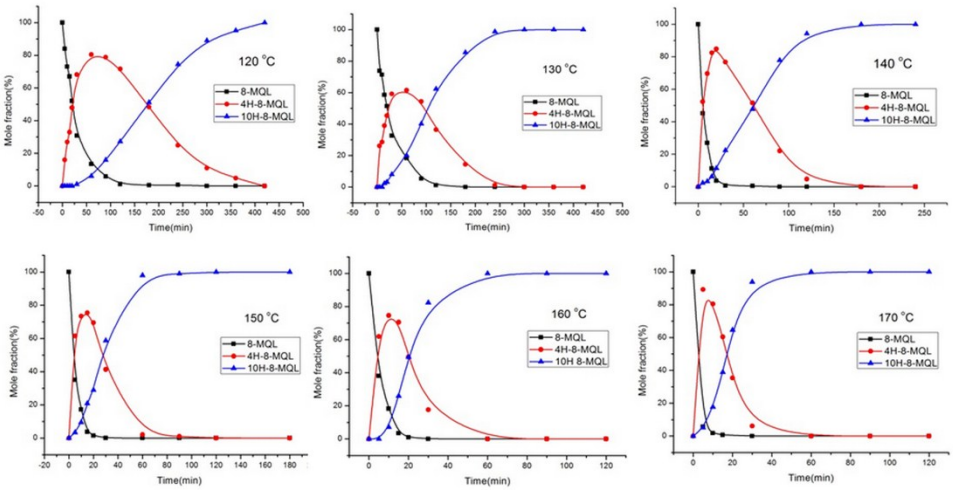

Figure S2. Mole fraction distributions for 8-MQL hydrogenation at 120 - 170 °C over Ru/Al_2O_3. General reaction conditions: 4 g 8-MQL, 0.4 g Ru/Al_2O_3, 40 ml dioxane as solvents, 7 MPa H_2.

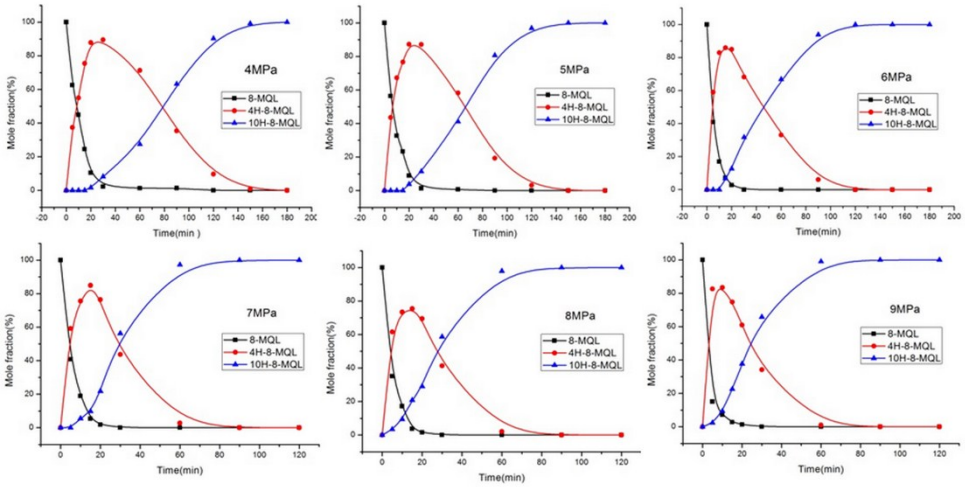

Figure S3. Mole fraction distributions for 8-MQL hydrogenation under 4 - 9 MPa over Ru/Al_2O_3. General reaction conditions: 4 g 8-MQL, 0.4 g Ru/Al_2O_3, 40 ml dioxane as solvents,160 °C.