Supporting information

Activity and Kinetics of Ruthenium Supported Catalysts for Sodium Borohydride Hydrolysis to Hydrogen

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Material

Carbon supporters were obtained from Cabot Corporation. All other chemicals were analytic grade from Sinopharm Chemical Reagent Co. Ltd. (Shanghai, China) and were used without additional treatment. The water used in all experiments was deionized water.

Preparation of the precursor Ni/C

In a typical procedure, 0.070 g $NiCl_2 \cdot 6H_2O$ was dissolved in the mixture with 20.0 mL deionized water and 3.5 mL ethanol. After stirring for 20 min, 3.60 g 0.28 wt.% polyvinylpyrrolidone (PVP) aqueous solution and 7 ml of 85 wt. % $N_2H_4 \bullet H_2O$ were added to the above solution. Then 4.00 g 12.5 wt. % NaOH solution was used to adjust pH of the solution. The mixture was vigorously stirred for 0.5 h and then 0.39 g carbon as the supporters also was added. The above mixture sample was transferred into a Teflon autoclave for hydrothermal synthesis at 333 K for 4 h. After cooling the autoclave to room temperature, the black solid was obtained by filtrating and washing with distilled water to remove Na^+.

Characterization of the samples

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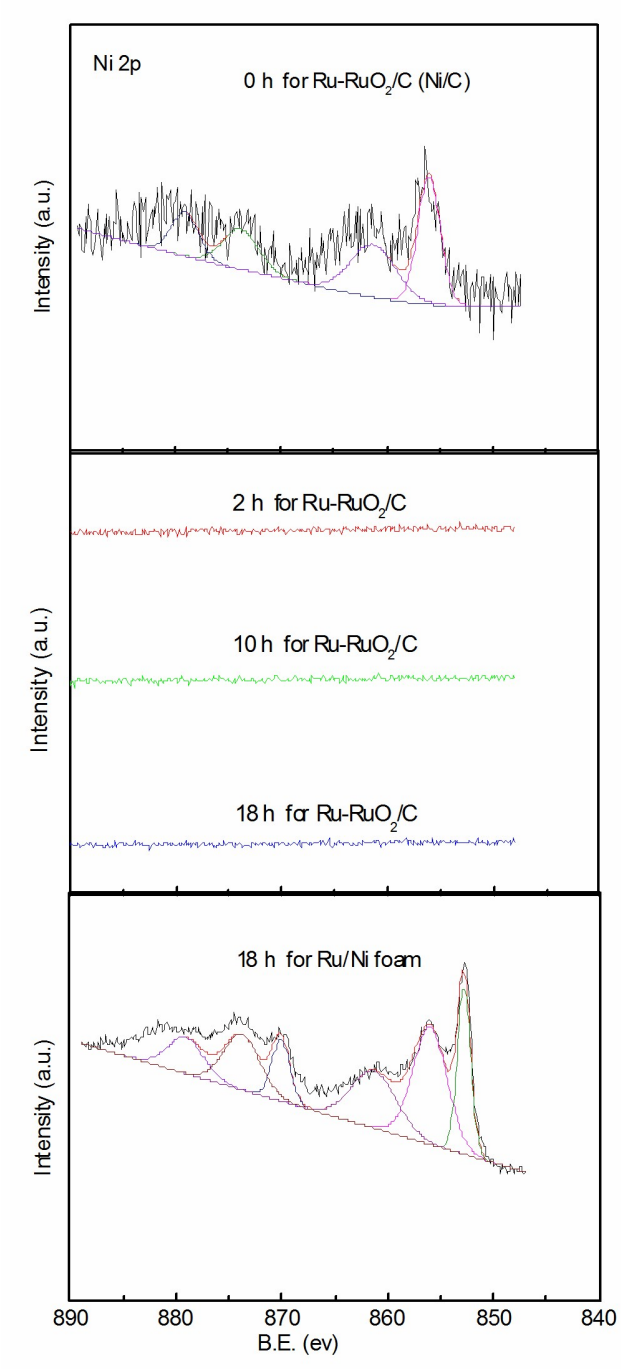

Figure S1 Ni2p spectrum of Ni/C

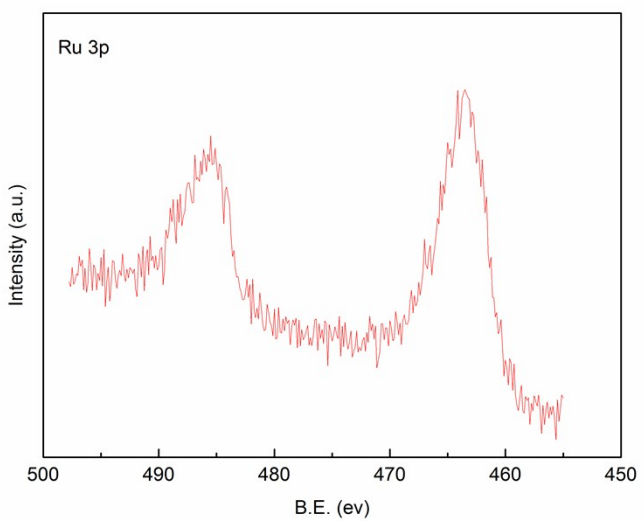

Figure S2 Ru 3p spectrum for NiO impregnated by the $RuCl_3$ solution

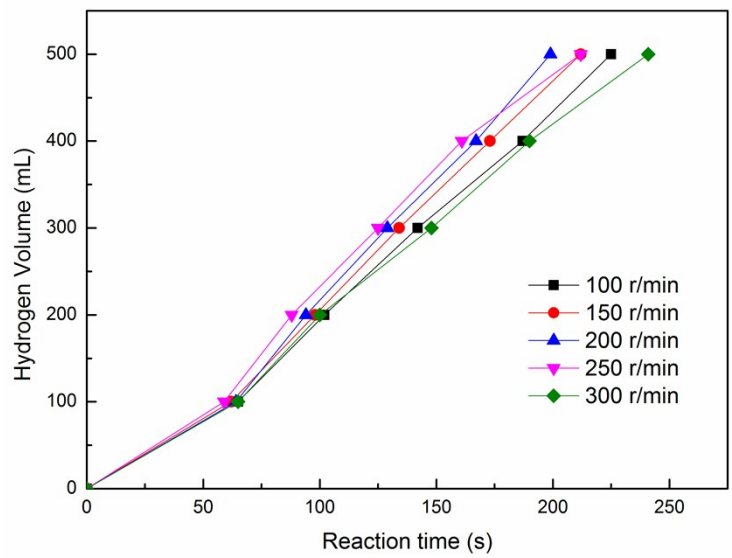

Figure S3 Effect of stirring speed on hydrogen generation