Supporting Information

Table S1 Solvatochromic parameters and H_2 solubility of various solvents[1-6]

#	Solvent	α (-)[a]	β (-)[b]	π* (-)[c]	X_{H2} x 10^4 (-)[d]
1	Water	1.17	0.18	1.09	0.14[2]
2	Ethyleneglycol	0.90	0.52	0.92	0.38[3]
3	Methanol	0.98	0.66	0.60	1.61[2]
4	Ethanol	0.83	0.77	0.54	2.06[2]
5	2-Propanol	0.76	0.95	0.48	4.61[4]
6	1-Butanol	0.79	0.88	0.47	2.63[2]
7	*t*-butanol	0.68	1.01	0.41	3.28[5]
8	*N*,*N*''-dimethylformamide	0.00	0.69	0.88	1.47[6]
9	1,4-Dioxane	0.00	0.37	0.55	1.84[6]
10	Diethyl ether	0.00	0.47	0.27	3.46[2]
11	Toluene	0.00	0.11	0.54	3.15[2]
12	Cyclohexane	0.00	0.00	0.00	4.14[2]
13	*n*-Hexane	0.00	0.00	-0.08	6.63[2]

a. Hydrogen-bond-donation ability.[1]

b. Hydrogen-bond-acceptance ability.[1]

c. Polarity/polarizability index.[1]

d. H_2 solubility in mole fraction at 298 K and 1 atm.[2-5]

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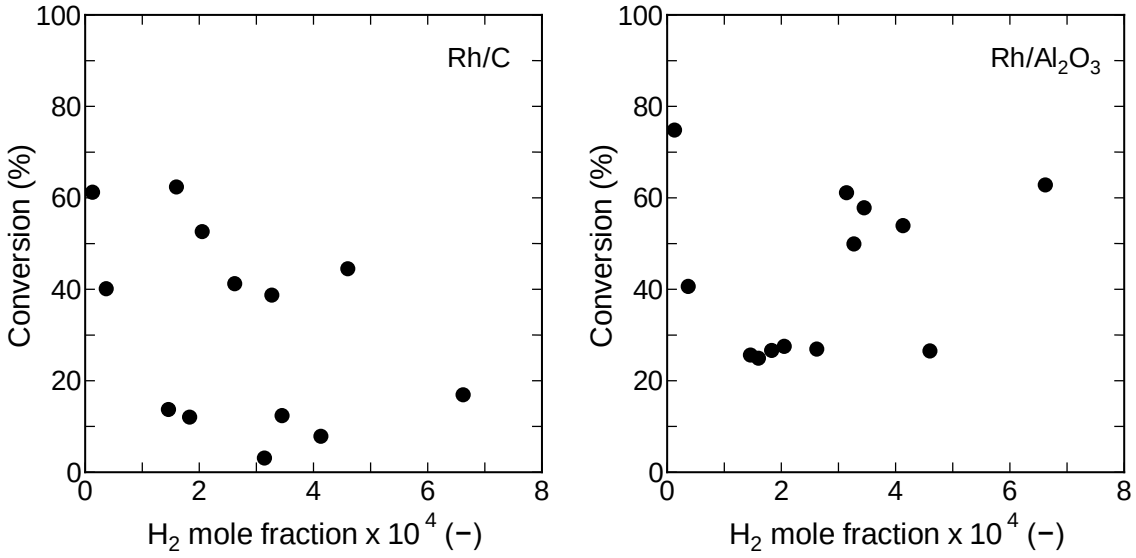

Fig. S1. Plots of total conversion observed in hydrogenation of acetophenone with Rh/C and Rh/Al_2O_3 catalysts (Fig. 1) against the mole fraction of H_2 in solvents used (Table S1)

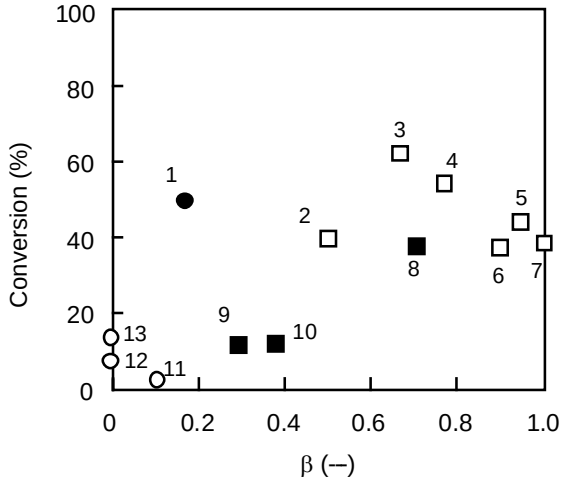

Fig. S2. The conversion over Rh/C vs. the β value of the solvents. Numbers given correspond to the different solvents in Fig. 1.

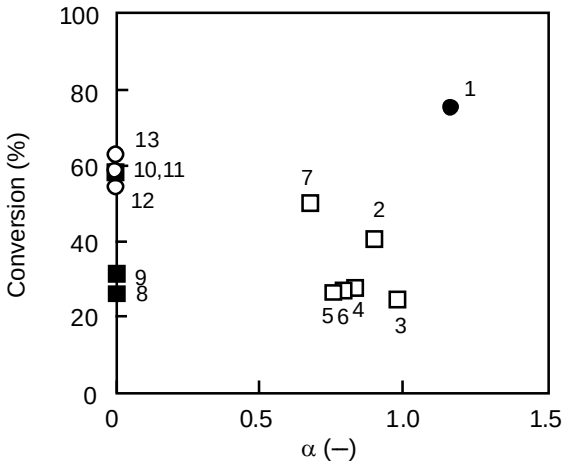

Fig. S3. The conversion over Rh/Al_2O_3 vs. the α value of the solvents. Numbers given correspond to the different solvents in Fig. 1.

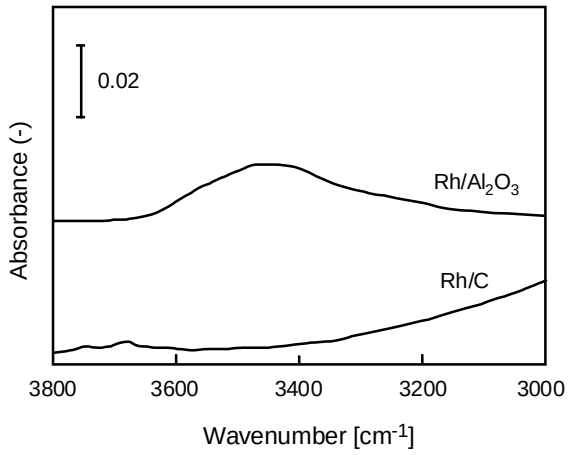

Fig. S4. Diffuse reflectance FTIR spectra of Rh/Al_2O_3 and Rh/C in the range of surface OH vibration. For the measurements, the catalyst samples were diluted with KBr in a 1/200 weight ratio.