Supporting Information

One-step solvothermal synthesis of Al-promoted Fe_3O_4 magnetic catalysts for selective oxidation of benzyl alcohol to benzaldehyde with H_2O_2 in water

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Table S1 Synthesis of Fe_3O_4-AIP with varying Al contents at 198 °C for 24h

Al content (wt%)	Al source[a] (mL)	$FeCl_3 \cdot 6H_2O$ (g)	NaOAc (g)	MEG (mL)
0.08	0.1	3.703	3.601	9.0
0.25	0.3	3.703	3.601	9.0
0.42	0.5	3.703	3.601	9.0
1.42	2.0	3.703	3.601	9.0
3.15	8.0	3.703	3.601	9.0
5.53	12.0	3.703	3.601	9.0

[a] The aluminium source was the saturated solution of aluminium isopropoxide in isopropanol.

Table S2 EDX analysis of Fe_3O_4-AIP-5.53%

Element	Content (wt%)				Average content (wt%)	Average content (atom%)
	Area 1	Area 2	Area 3	Area 4		
Fe	54.04	44.37	55.39	53.19	51.75	24.04
O	40.07	40.28	38.79	40.54	39.92	64.73
Al	5.90	4.57	5.82	5.81	5.53	5.32
C	-	10.78	-	-	2.70	5.83
Cl	-	-	-	0.46	0.12	0.09

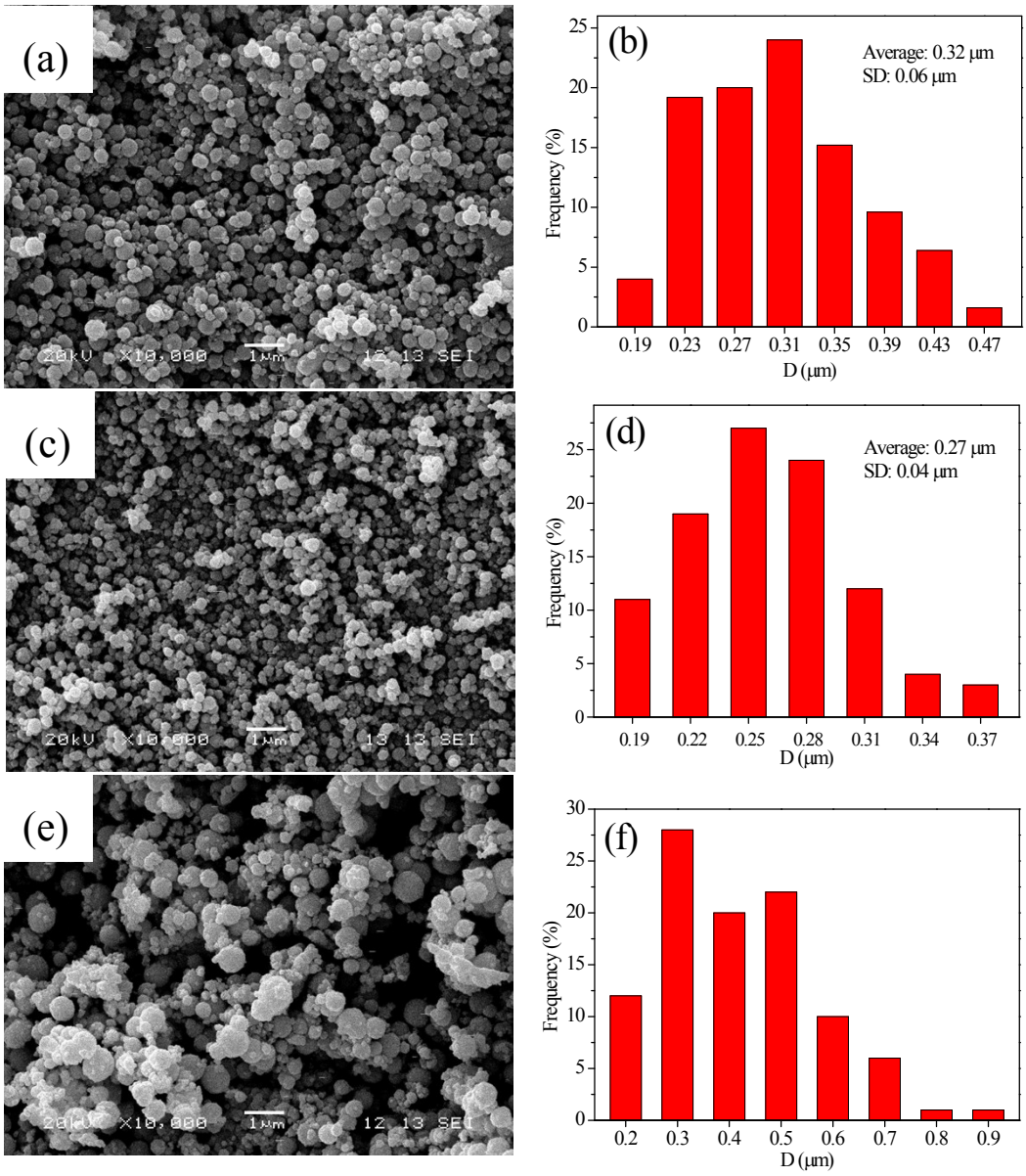


Fig. S1 SEM images and corresponding particle size distribution histograms of Fe_3O_4-AC (a and b), Fe_3O_4-AN (c and d) and Fe_3O_4-AS (e and f).

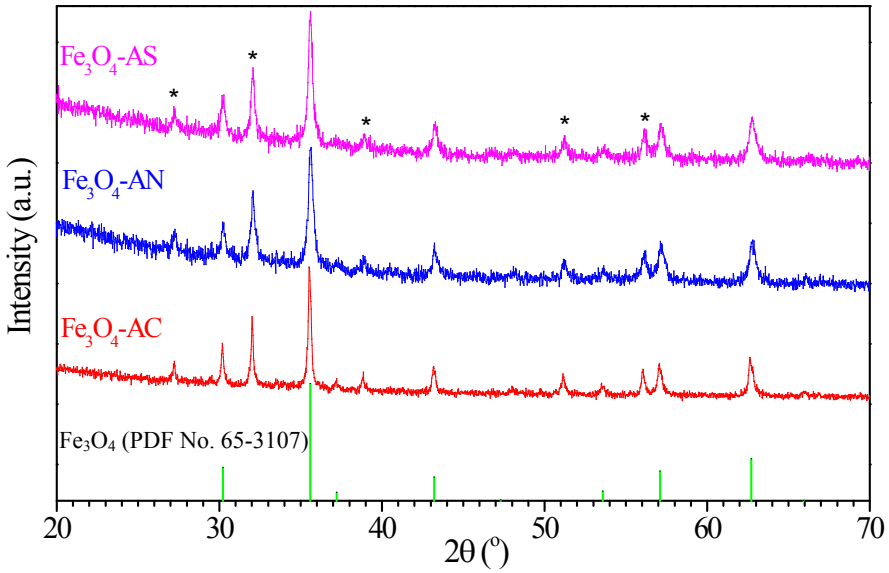


Fig. S2 XRD patterns of Fe_3O_4-AC, Fe_3O_4-AN and Fe_3O_4-AS samples. Asterisks indicate five unidentified peaks besides the diffraction peaks of Fe_3O_4.

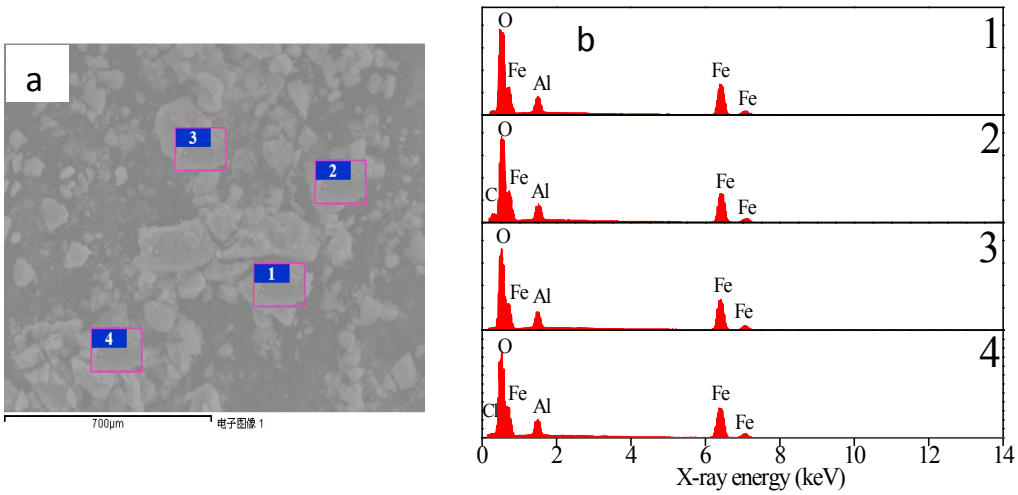
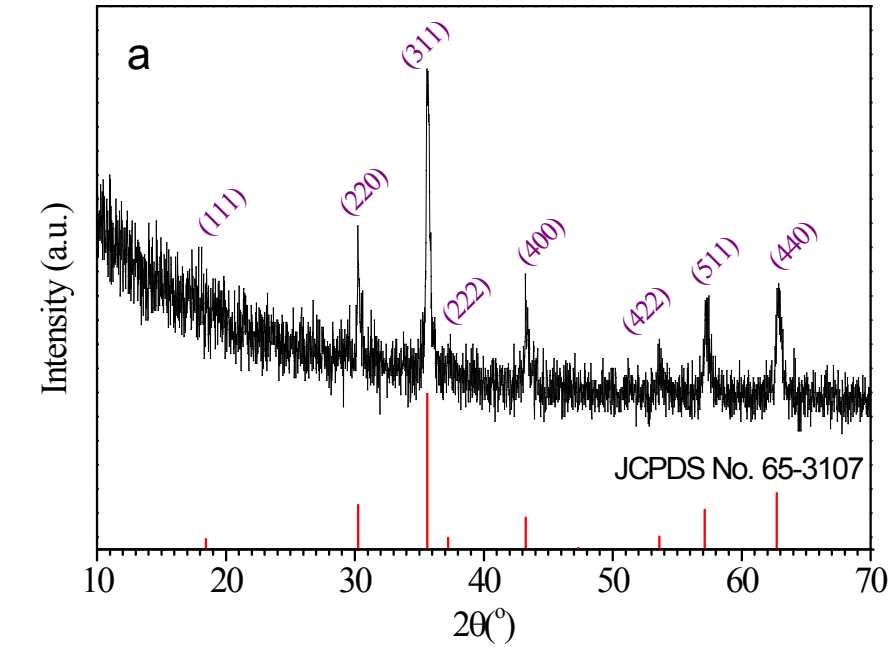


Fig. S3 EDX analysis of Fe_3O_4-AIP-5.53%. (a) Detection areas and (b) Corresponding EDX spectra.



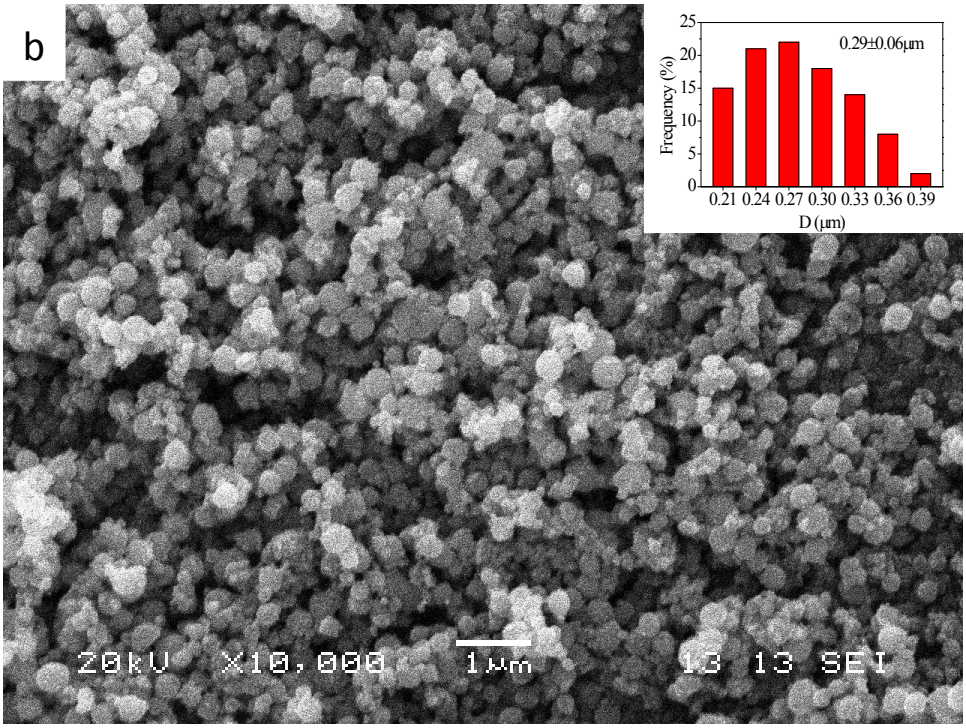


Fig. S4 XRD (a) and SEM (b) of magnetically recovered Fe_3O_4-AIP-1.42% catalyst after the reaction at the first run.

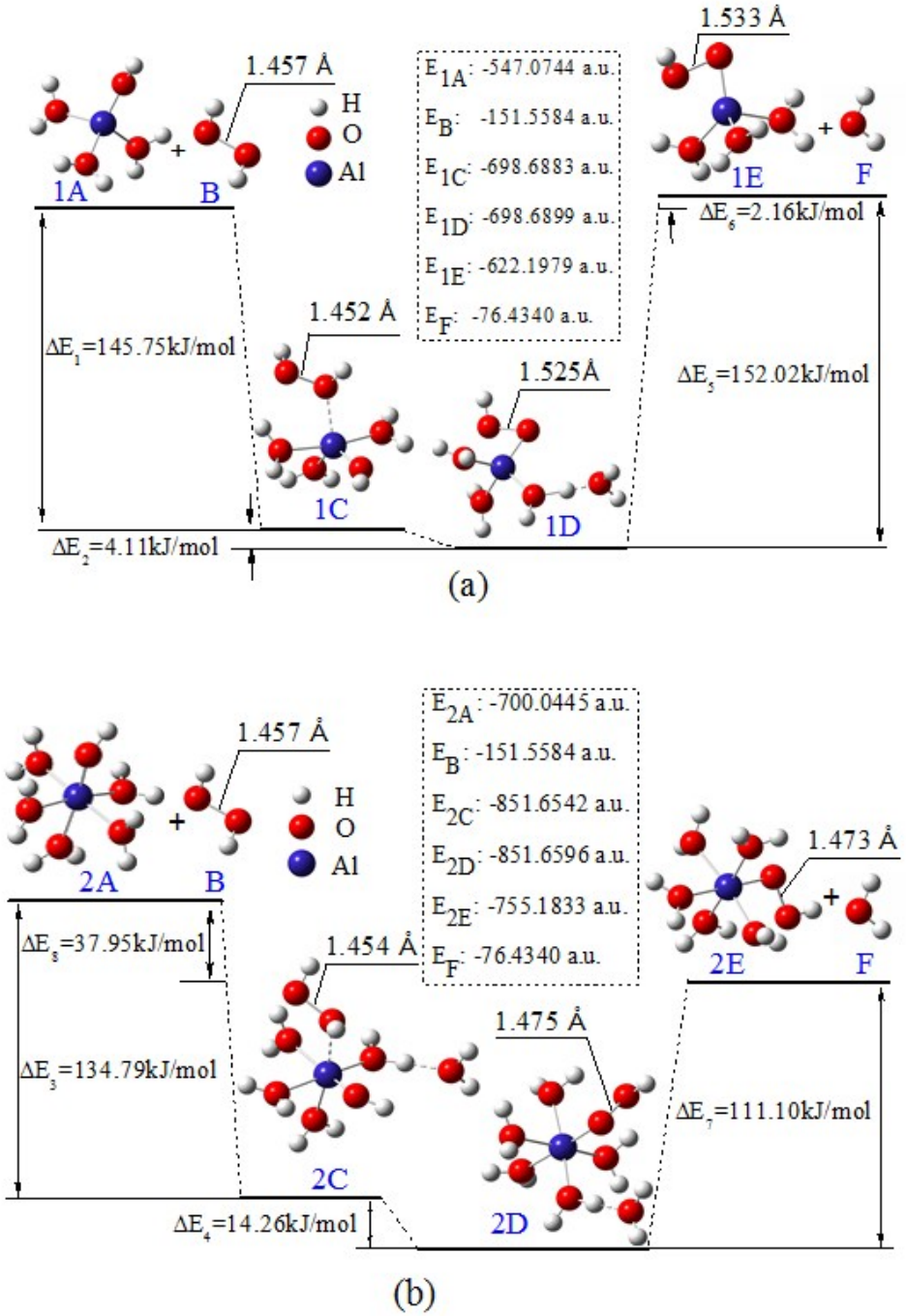


Fig. S5 Energy diagrams calculated at B3LYP/6-31+G(d,p) level by DFT. (a) Energy changes during the interaction between $[Al(OH)(H_2O)_3]^{2+}$ (1A) and H_2O_2 (B); (b) Energy changes during the interaction between $[Al(OH)(H_2O)_5]^{2+}$ (2A) and H_2O_2 (B).