

## *Supporting Information*

# **Co/rGO Synthesized via Alcohol Thermal Methods as Heterogeneous Catalyst for Highly Efficient Oxidation of Ethylbenzene with Oxygen**

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**General Remarks:** Benzyl alcohol, acetonitrile and acetophenone were purchased from Tianjin Fuyu Fine Chemical Co. Ltd. (Tianjin, China). N-Hydroxyphthalimide (NHPI) and  $\text{Co}(\text{OAc})_2 \cdot 4\text{H}_2\text{O}$  were purchased from Sigma Chemical Co. (St. Louis, MO, USA), and the natural graphite powder was obtained from Sinopharm chemical reagent Co. Ltd. (China). All other reagents were of analytical grade and ultrapure water was used throughout the study.

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**Figure S4. Element mapping of Co/GO catalyst**

**Figure S5. XPS spectral of Co/GO catalyst after 5 cycles.**

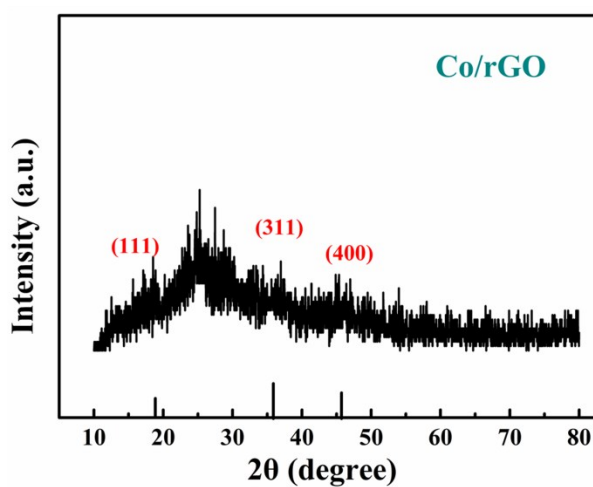
**Fig. S6  $^1\text{H}$ NMR of the product acetophenone**

**Fig. S7 GC-MS spectrogram of the reaction solution**

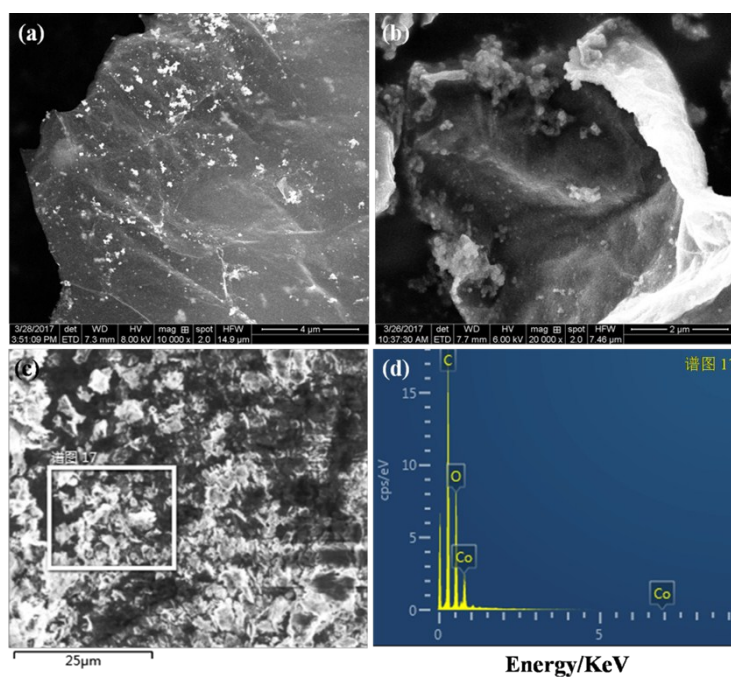
**Table S1** Compositions of the Co/rGO catalyst.

Sample	Atomic % <sup>a</sup>			Weight % <sup>a</sup>	Weight % <sup>b</sup>
	C	O	Co	Co	Co
Co/rGO	55.9	32.5	11.6	36.5	35.8

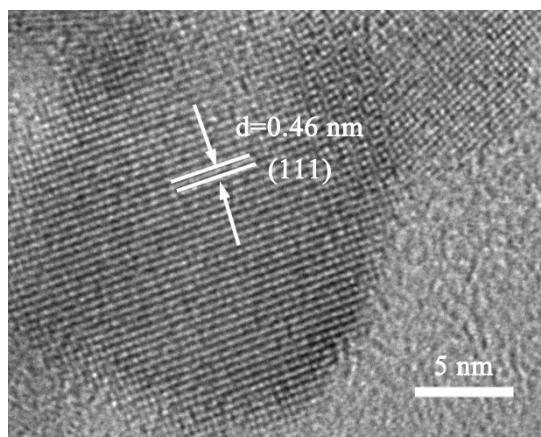
<sup>a</sup>The surface elemental composition of the catalyst determined by XPS. <sup>b</sup>The total cobalt loading analysed by ICP-OES.



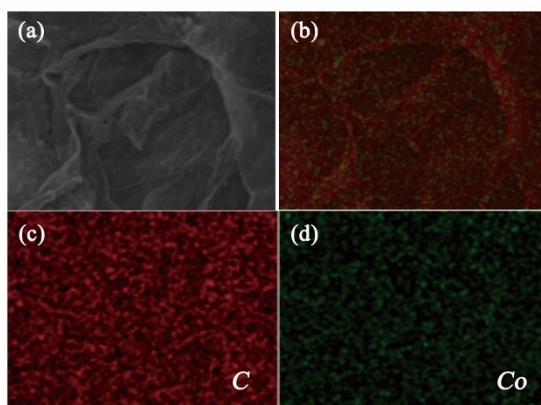
**Fig. S1.** XRD pattern of Co/rGO composite after five runs used.



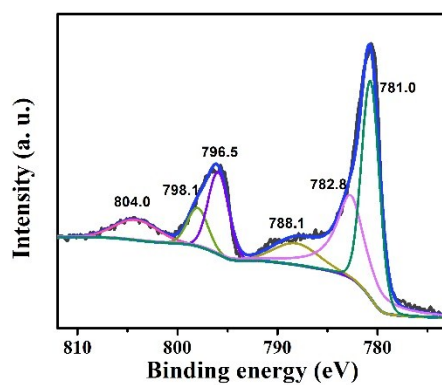
**Fig. S2.** SEM (a-c) and EDS (d) images of Co/rGO after five runs used.



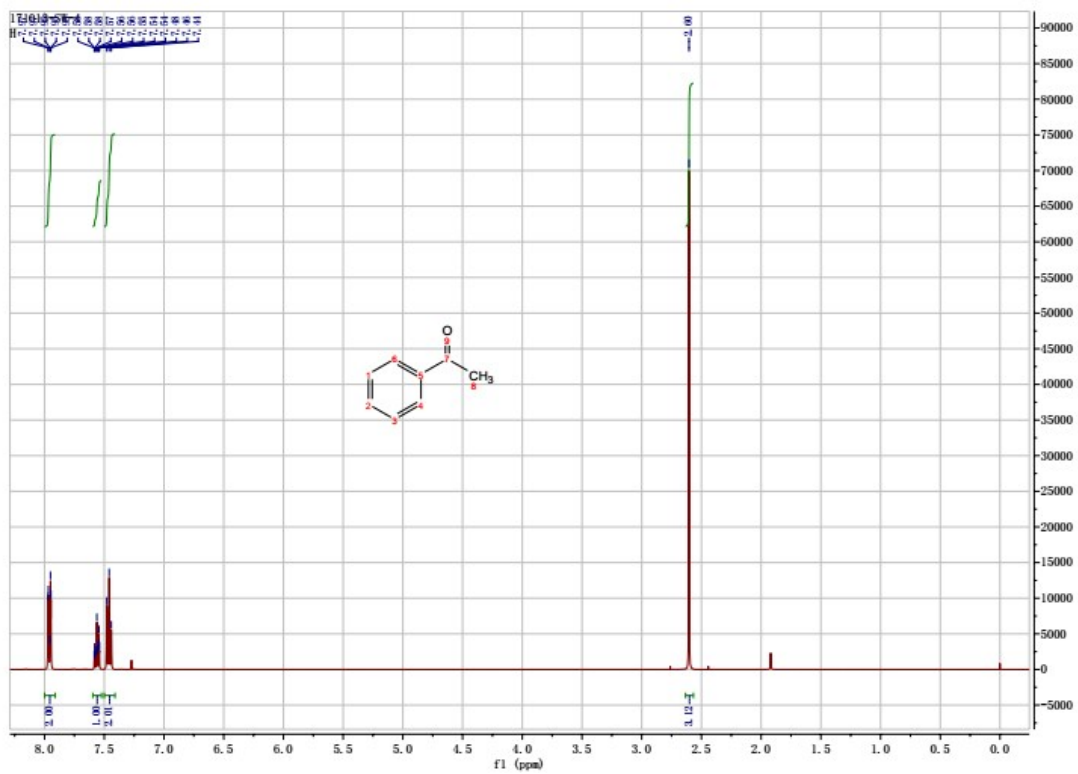
**Fig.S3.** HRTEM image of Co<sub>3</sub>O<sub>4</sub> nanoparticles on GO nanosheet.



**Figure S4.** Element mapping of Co/GO catalyst



**Figure S5.** XPS spectral of Co/GO catalyst after 5 cycles.



**Fig. S6. <sup>1</sup>H NMR of the product acetophenone.**

# GCMS Analysis Report

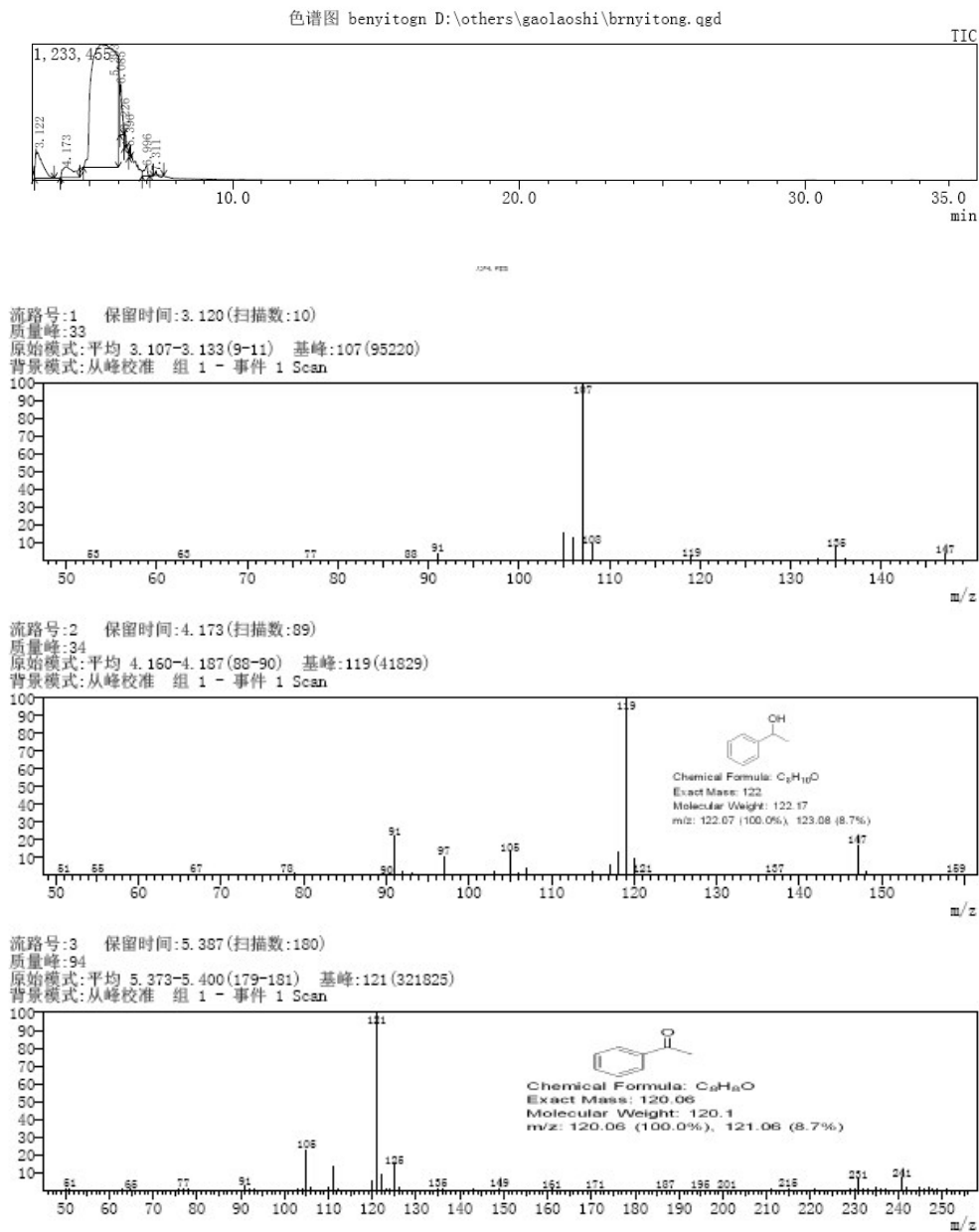


Fig. S7. GC-MS spectrogram of the reaction solution.