

Electronic Supplementary Information

Synthesis of BiFeO₃ nanowire- Reduced Graphene Oxide based Magnetically Separable nanocatalyst and its Versatile Catalytic Activity towards Multiple Organic Reactions.

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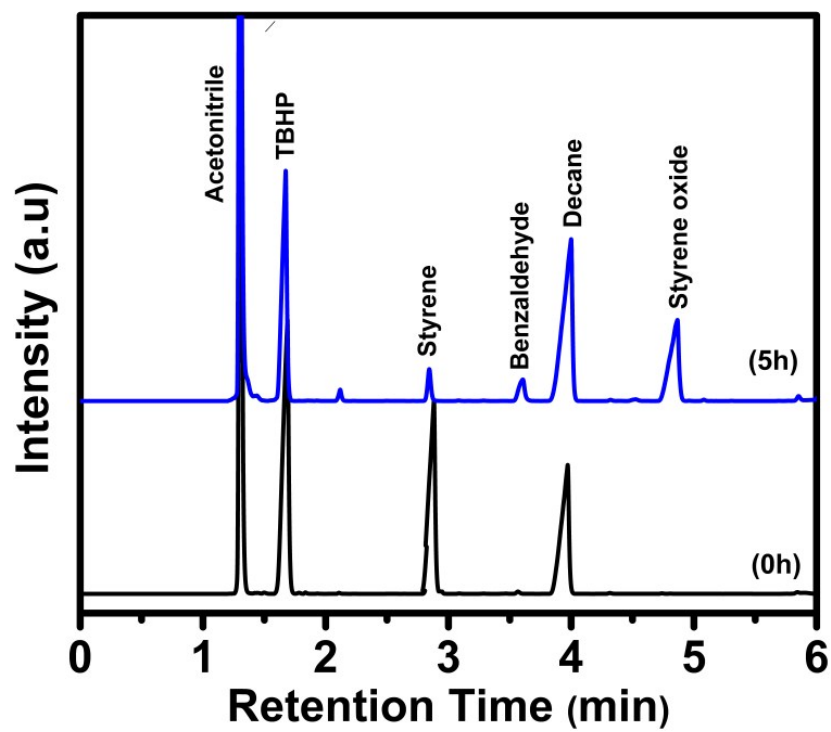


Fig. S1 Gas chromatogram analysis of styrene epoxidation reaction with BFO-RGO nanocatalyst.

Spectral Data

5-Ethoxycarbonyl-4-phenyl-6-methyl-3,4-dihydropyrimidin-2(1*H*)-one:

Solid, m.p. 204-205°C (reported 205-206°C (Ref. 4), FTIR (KBr): 3434, 3235, 3111, 2932, 1711, 1647, 1575 cm⁻¹. ¹H NMR (CDCl₃, 400 MHz): δ=1.18 (t, 3H), 2.37 (s, 3H), 4.10 (m, 2H), 5.42 (s, 1H), 5.69 (s, 1H), 7.29-7.34 (m, 5H), 7.95 (s, 1H).

5-Acetyl-6-methyl-4-phenyl-3,4-dihydropyrimidin-2(1*H*)-one:

Solid, m.p. 236-237°C (reported 235-236°C. (Ref. 4) IR (KBr): 1616, 1701, 2920, 3116, 3294 cm⁻¹. ¹H NMR (DMSO-d₆, 400 MHz): δ=2.11(s, 3H), 2.30 (s, 3H), 5.27 (s, 1H), 7.25-7.33 (m, 5H), 7.83 (s, 1H), 9.18 (s, 1H).

2-phenyl-2-(4-phenyl-1*H*-1,2,3-triazol-1-yl)ethanol:

Solid, m.p. 127-128°C (reported 125-127°C (Ref. 9), IR (KBr): 693, 755, 1057, 1084, 1223, 1431, 1455, 1493, 2939, 3029, 3089, 3123, 3427 cm⁻¹. ¹H NMR (CDCl₃, 400 MHz): δ=3.62 (t, 1H), 4.25 (m, 1H), 4.68 (m, 1H), 5.70 (dd, 1H), 7.28-7.43 (m, 8H), 7.72 (s, 1H), 7.79 (d, 1H).

2-(4-Phenyl-1*H*-1,2,3-triazol-1-yl) cyclohexanol:

Solid, m.p. 172-174°C (reported 168.0-171.0°C (Ref. 9), IR (KBr): 696, 763, 1054, 1232, 1447, 2858, 2938, 3119, 3298 cm⁻¹. ¹H NMR (CDCl₃, 400 MHz): δ= 1.42-2.27 (m, 8H), 3.91 (s, 1H), 4.14 (m, 2H), 7.28-7.39 (m, 3H), 7.67 (d, 2H), 7.75 (s, 1H).

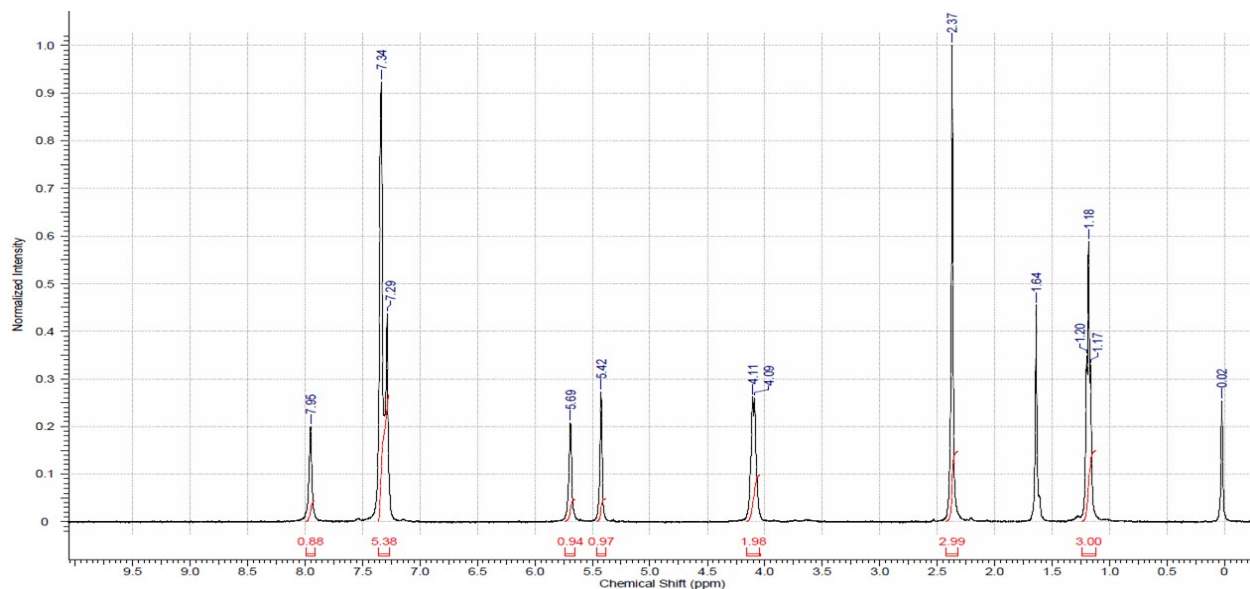


Fig. S2 ^1H NMR Spectrum of synthesized 5-Ethoxycarbonyl-4-phenyl-6-methyl-3,4-dihydropyrimidin-2(1H)-one synthesized *via* Biginelli reaction catalyzed by BFO-RGO.

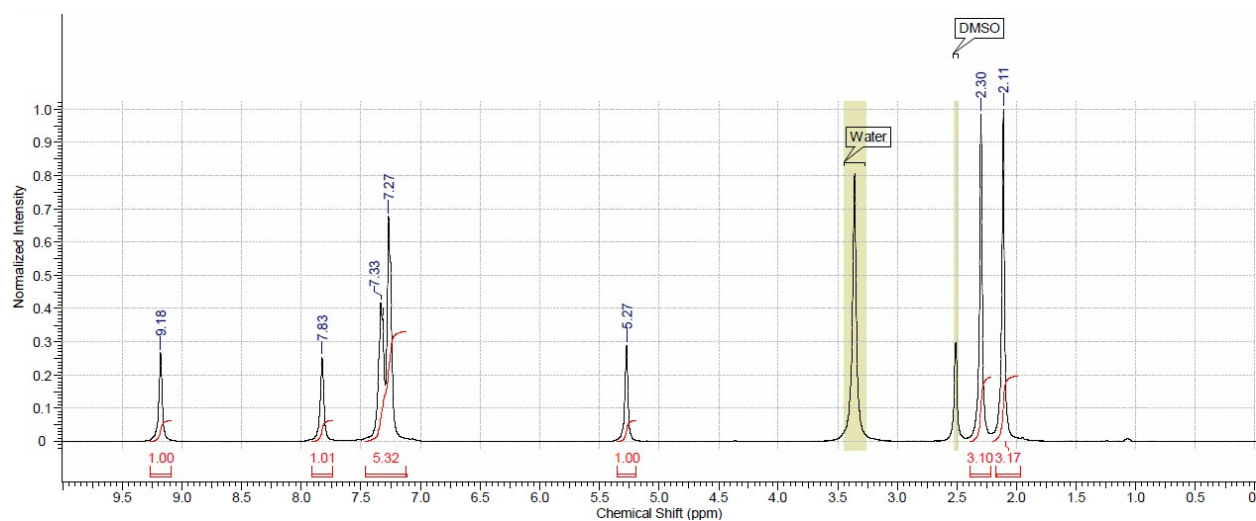


Fig. S3 ^1H NMR Spectrum of synthesized 5-Acetyl-6-methyl-4-phenyl-3,4-dihydropyrimidin-2(1H)-one synthesized *via* Biginelli reaction catalyzed by BFO-RGO.

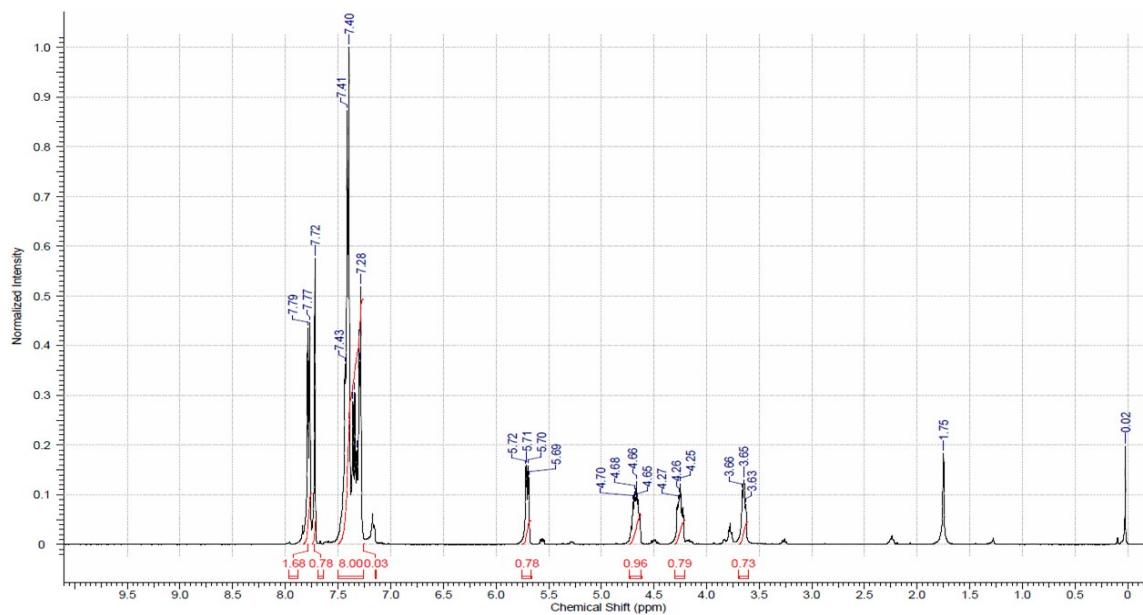


Fig. S4 ¹H NMR Spectrum of synthesized 2-phenyl-2-(4-phenyl-1H-1,2,3-triazol-1-yl)ethanol synthesized *via* Click reaction catalyzed by BFO-RGO.

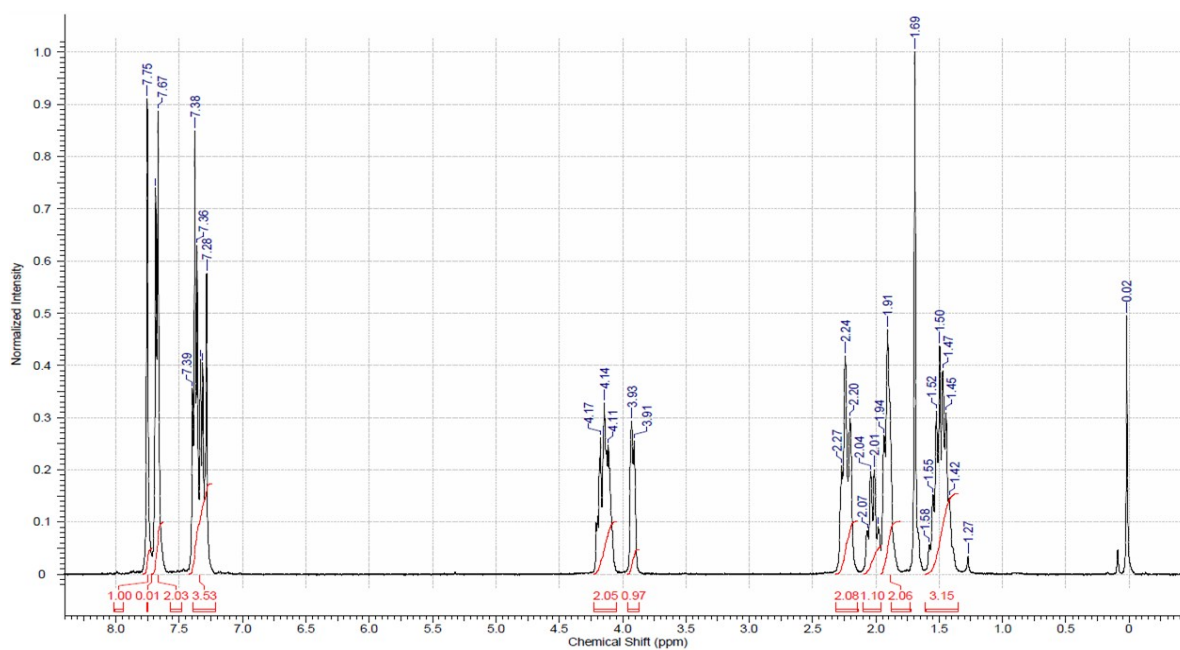


Fig. S5 ^1H NMR Spectrum of synthesized 2-(4-Phenyl-1*H*-1,2,3-triazol-1-yl)cyclohexanol synthesized *via* Click reaction catalyzed by BFO-RGO.

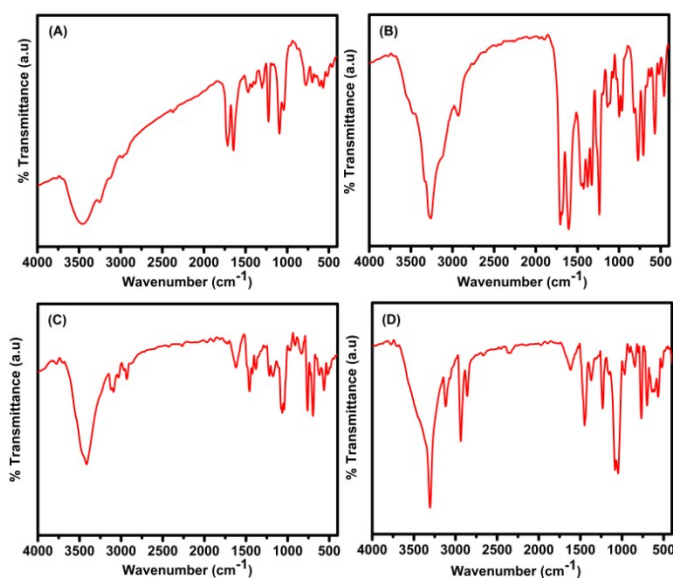


Fig. S6 FT-IR spectrum of (A) 5-Ethoxycarbonyl-4-phenyl-6-methyl-3,4-dihydropyrimidin-2(1*H*)-one, (B) 5-Acetyl-6-methyl-4-phenyl-3,4-dihydropyrimidin-2(1*H*)-one, (C) 2-phenyl-2-(4-phenyl-1*H*-1,2,3-triazol-1-yl)ethanol and (D) 2-(4-phenyl-1*H*-1,2,3-triazol-1-yl)cyclohexanol.

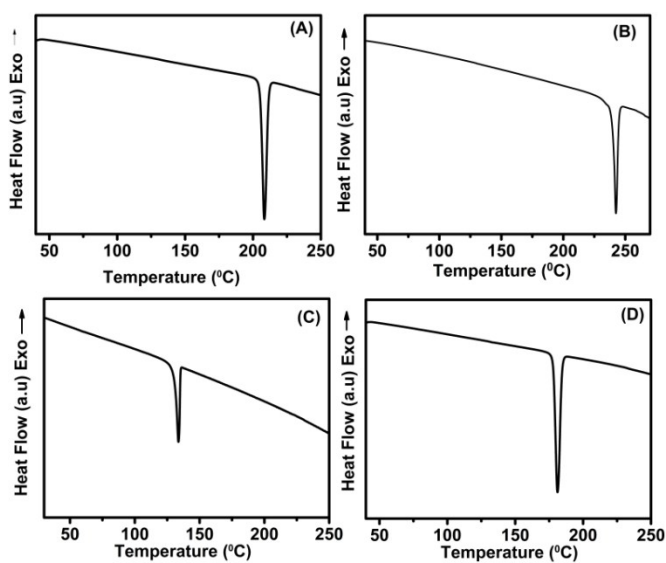


Fig. S7 DSC of (A) 5-Ethoxycarbonyl-4-phenyl-6-methyl-3,4-dihydropyrimidin-2(1*H*)-one, (B) 5-Acetyl-6-methyl-4-phenyl-3,4-dihydropyrimidin-2(1*H*)-one, (C) 2-phenyl-2-(4-phenyl-1*H*-1,2,3-triazol-1-yl)ethanol and (D) 2-(4-Phenyl-1*H*-1,2,3-triazol-1-yl)cyclohexanol.

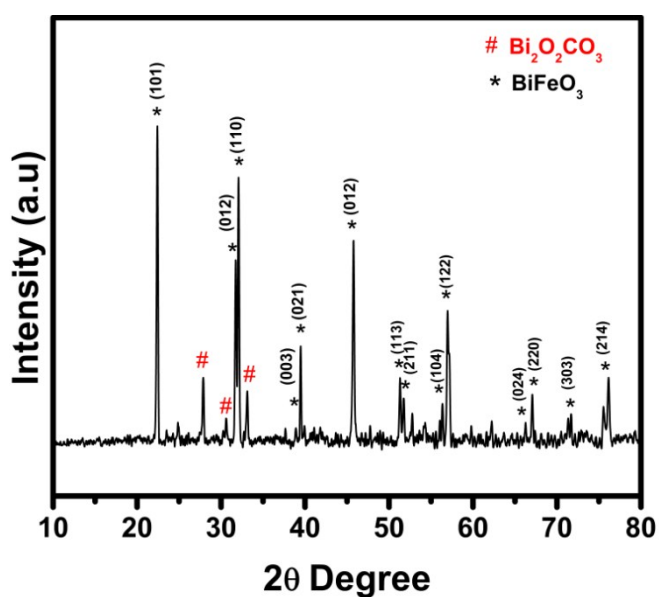


Fig. S8 Room temperature wide angle powder XRD patterns of 97BFO-3RGO (3 wt. % RGO content BiFeO_3 nanowire).

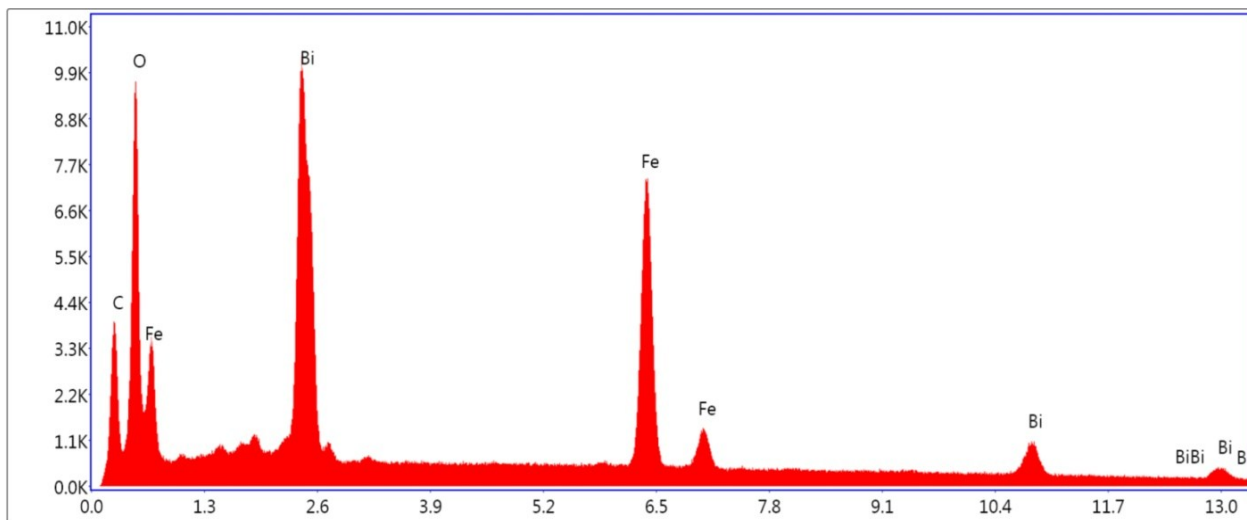


Fig. S9 EDAX spectra of synthesized BFO-RGO nanocomposite.

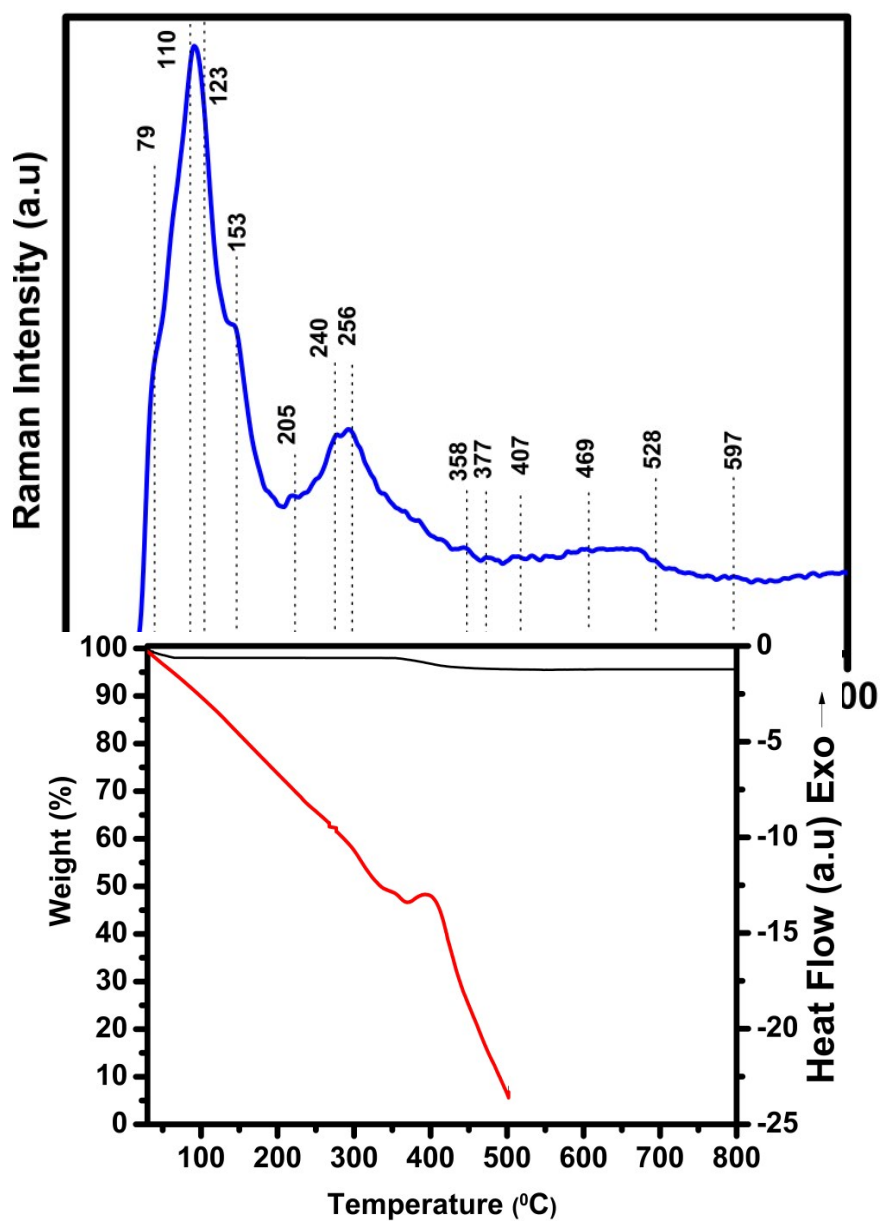


Fig. S10
spectra of

Raman
pure BFO

Fig. S11. TGA and DSC thermogram of BFO-RGO nanocatalyst

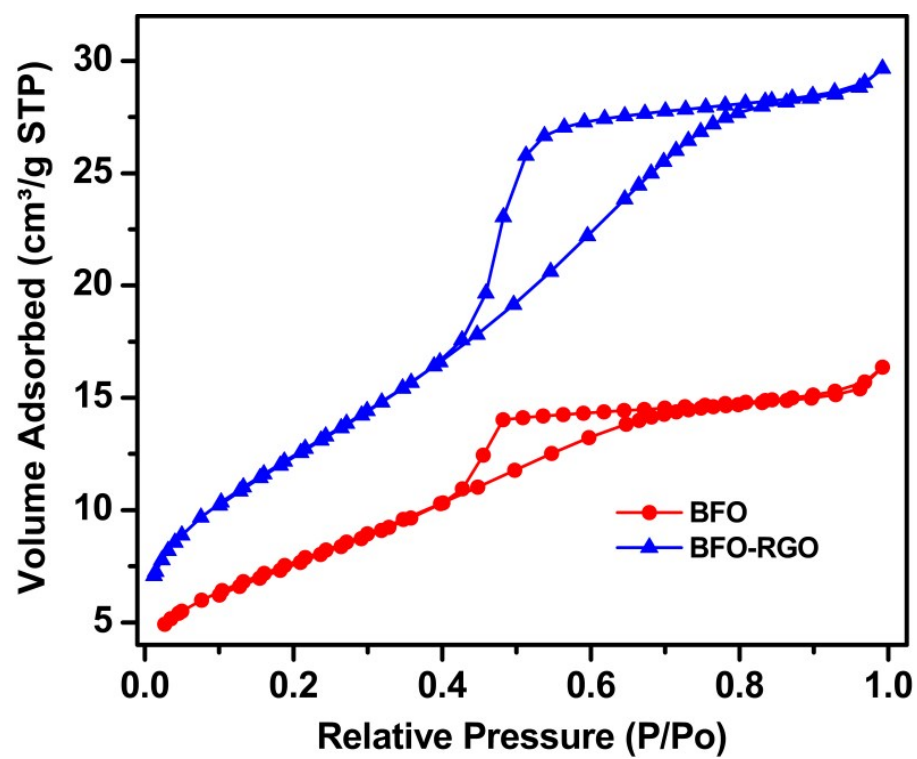


Fig. S12 N₂ adsorption-desorption isotherm of BFO and BFO-RGO nanocatalyst

Reusability of magnetically separable BFO-RGO catalyst after catalysis reactions.

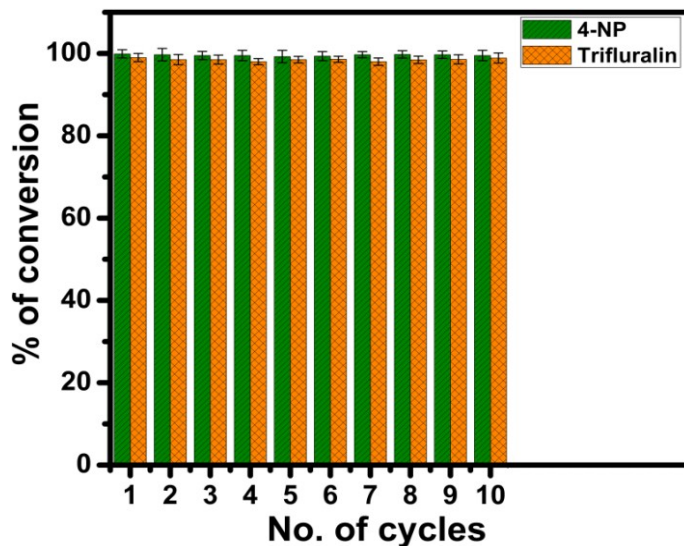


Fig. S13 Reusability of magnetically separable catalyst (BFO-RGO) for reduction of 4-NP and trifluralin.

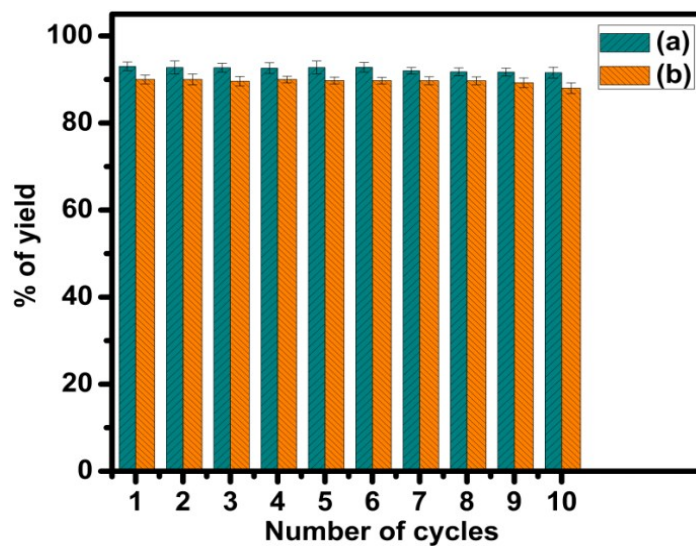


Fig. S14 Percentage of yield for synthesis of (a) 5-Ethoxycarbonyl-4-phenyl-6-methyl-3,4-dihydropyrimidin-2(1*H*)-one and (b) 5-Acetyl-6-methyl-4-phenyl-3,4-dihydropyrimidin-2(1*H*)-one *via* Biginelli reaction in successive uses of BFO-RGO catalyst.

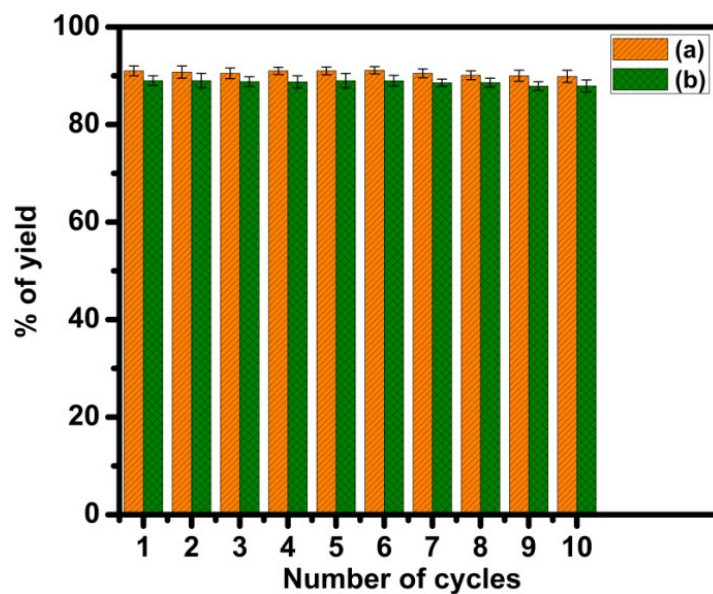


Fig. S15 Percentage of yield for synthesis of (a) 2-phenyl-2-(4-phenyl-1*H*-1,2,3-triazol-1-yl)ethanol and (b) 2-(4-Phenyl-1*H*-1,2,3-triazol-1-yl)cyclohexanol *via* Click reaction in successive uses of BFO-RGO catalyst.

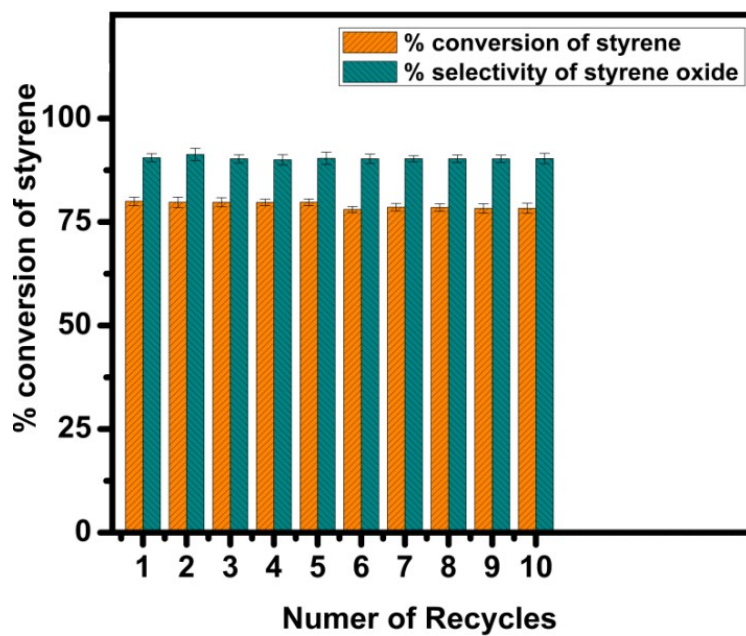


Fig. S16 Recycling results for styrene epoxidation for the catalyst BFO-RGO.