Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Environmental friendly cyclotrimerization of substituted acetophenones catalyzed by γ-Al_2O_3 nanoparticles decorated with $H_5PW_{10}V_2O_{40}$ as a new nanocomposite

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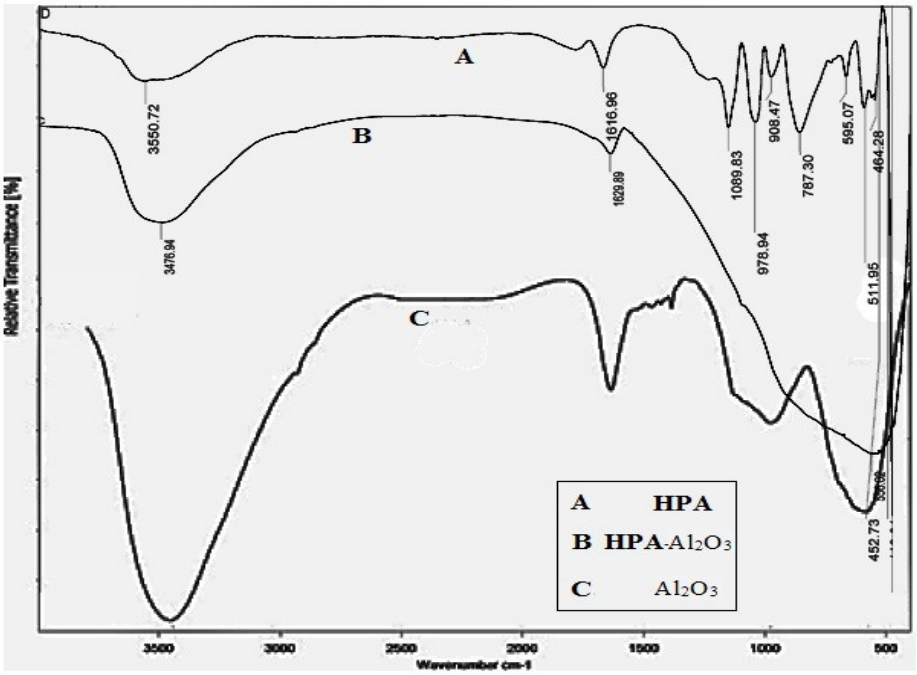


Fig. S1. FT-IR spectra of free $H_5PW_{10}V_2O_{40}$ (A), HPA impregnated nano-γ-Al_2O_3 (B), and nano-γ-Al_2O_3 (C).

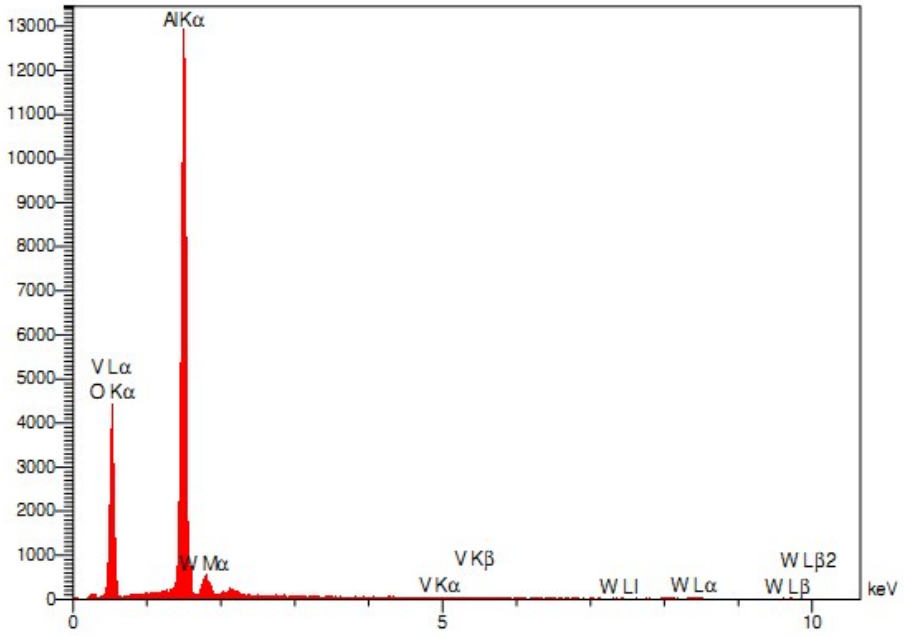


Fig. S2. EDX of γ-Al_2O_3/$H_5PW_{10}V_2O_{40}$.

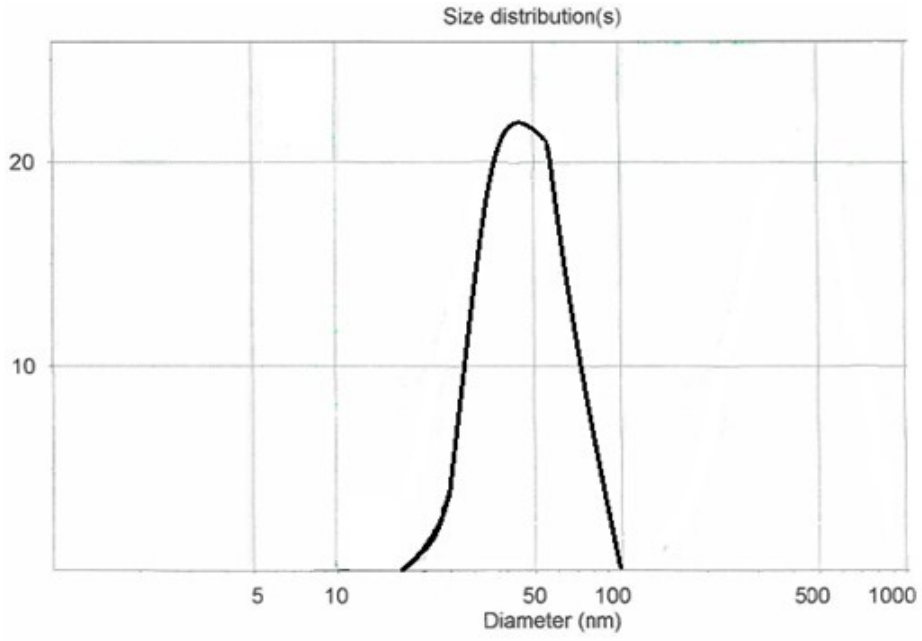


Fig. S3. Dynamic light scattering (DLS) analysis of γ-Al_2O_3/$H_5PW_{10}V_2O_{40}$.

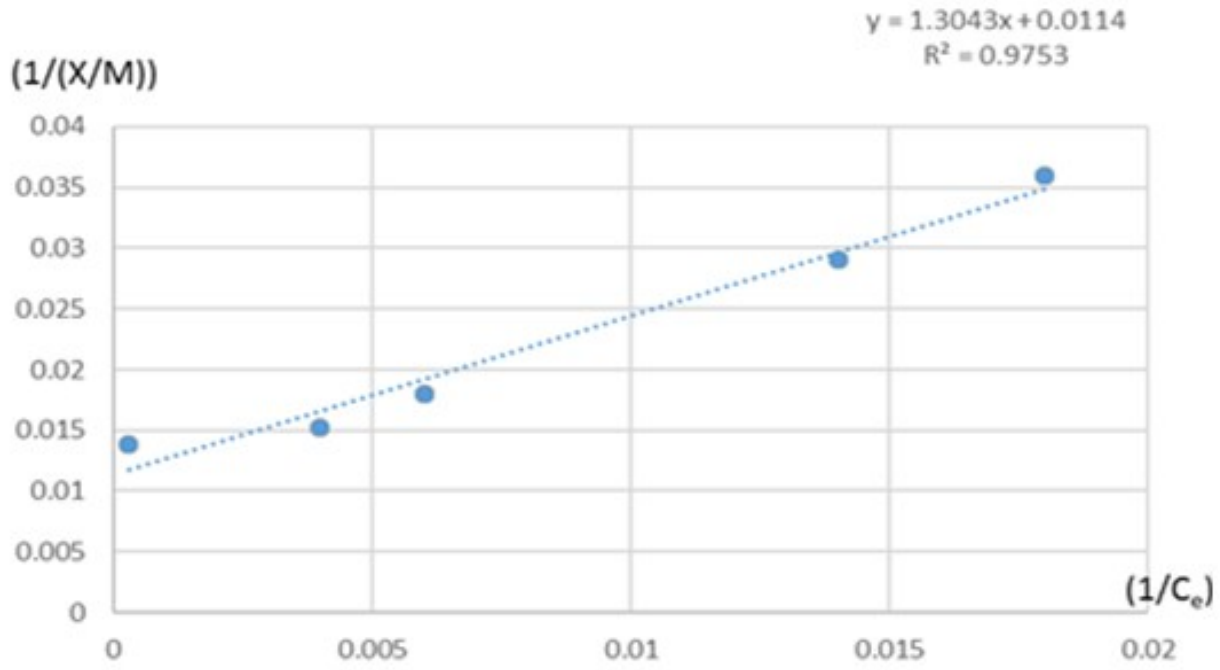
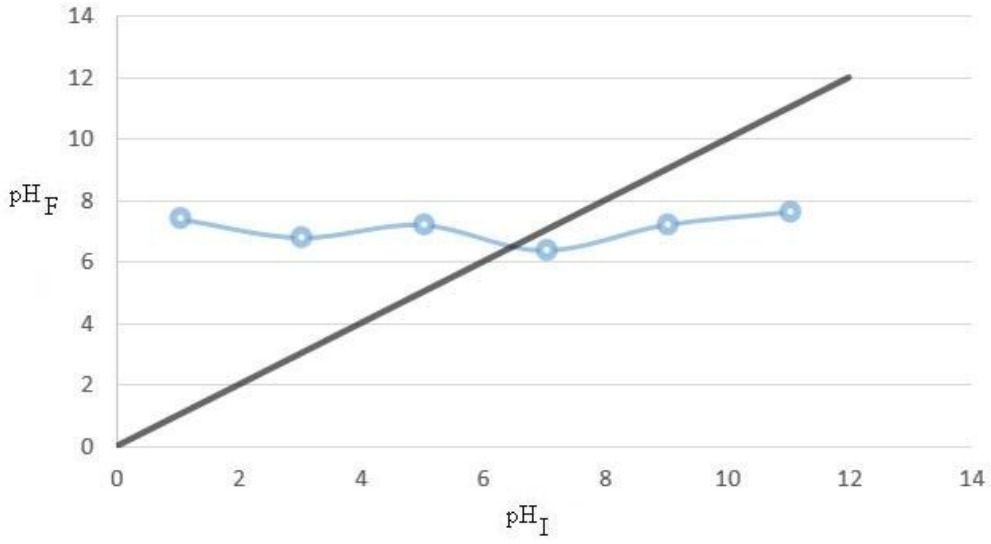
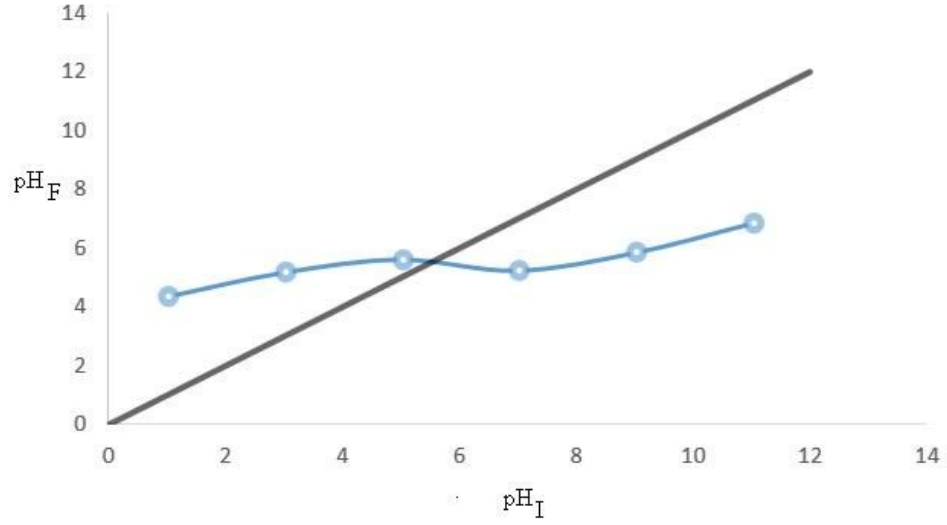


Fig. S4. The experimental and theoretical plot of HPA adsorption on γ-Al_2O_3 based on *Langmuir* adsorption isotherm.



(a)



(b)

Fig. S5. pH_F *vs.* pH_I for γ-Al_2O_3 (a) and γ-Al_2O_3/HPA (b).

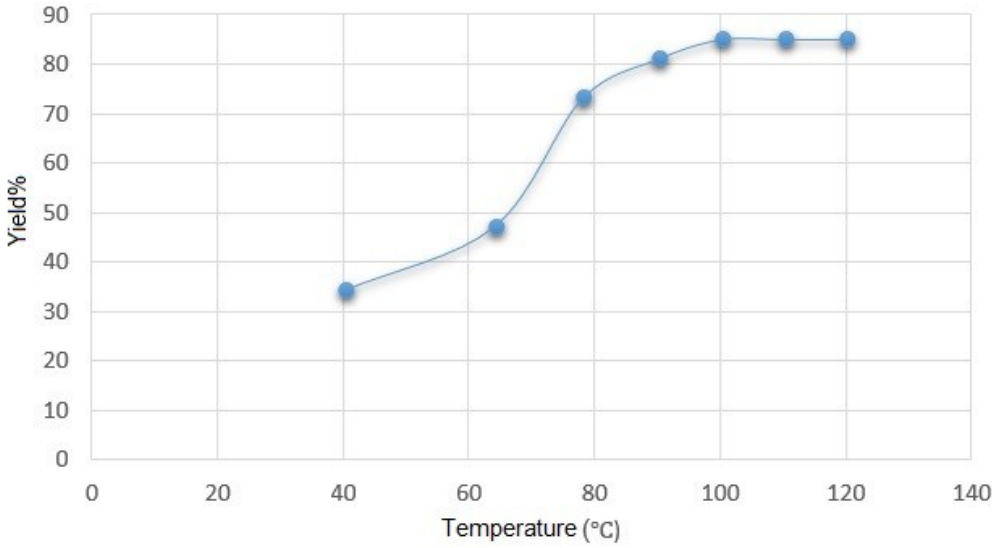


Fig. S6. Effect of temperature on the condensation of acetophenone.

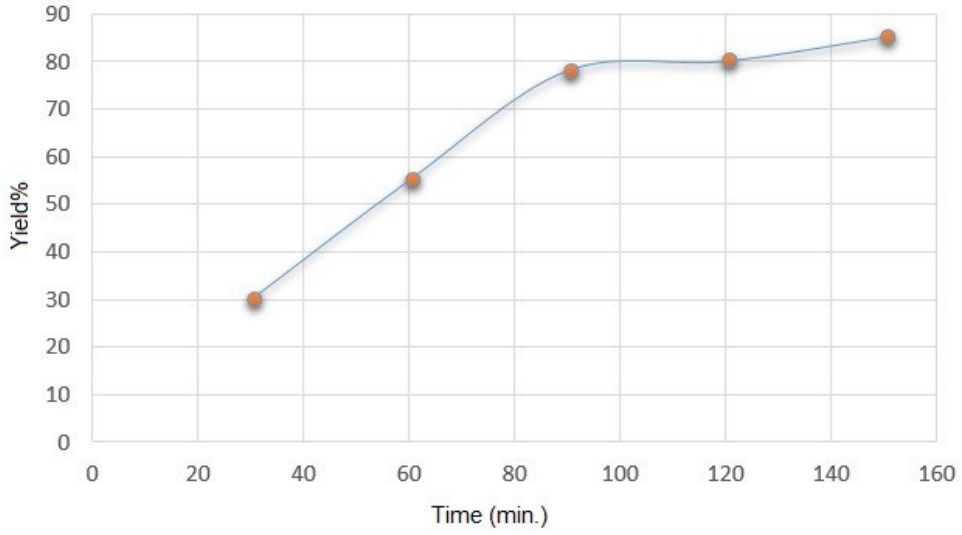


Fig. S7. Effect of reaction time on the condensation of acetophenone.

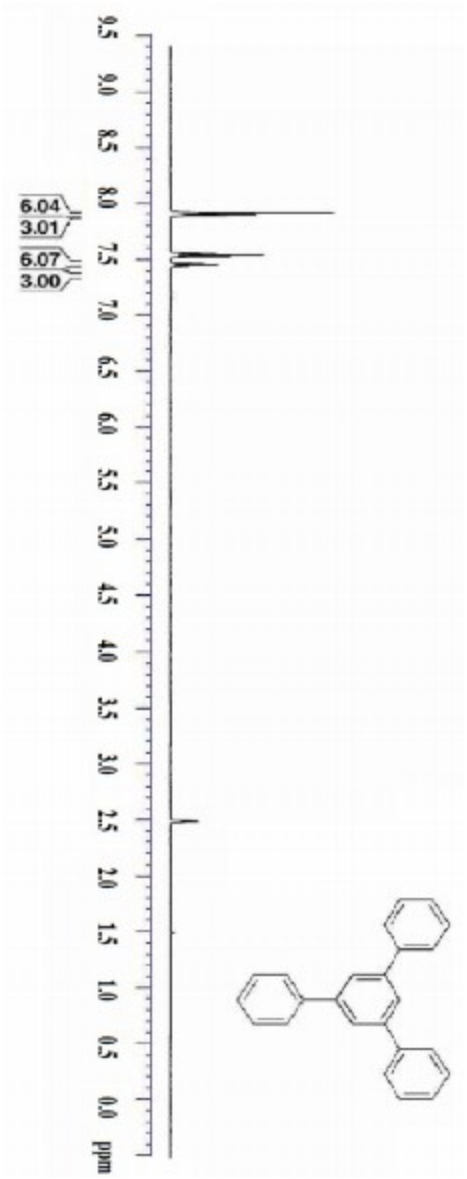


Fig. S8. ^{1}H NMR of 1,3,5-Triphenylbenzene.

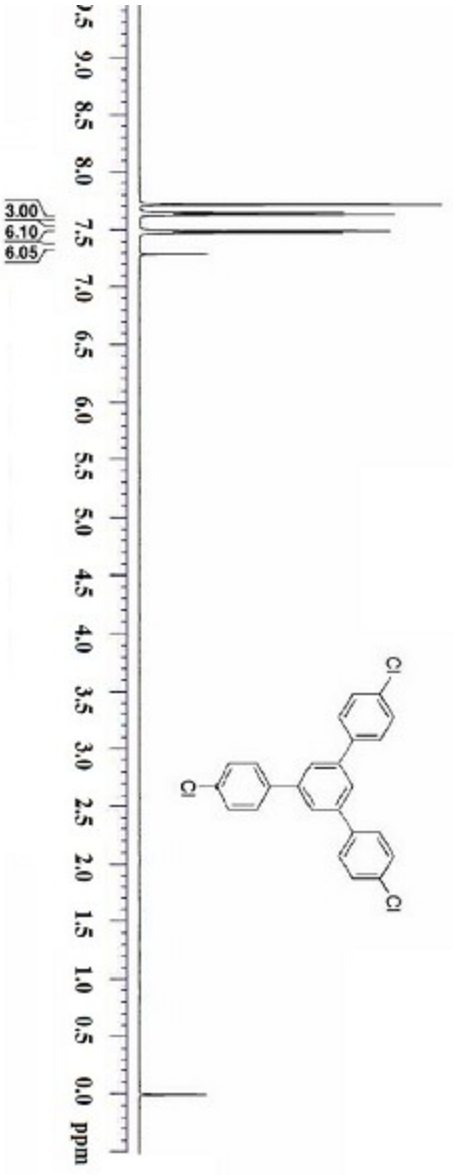


Fig. S9. ^{1}H NMR of 1,3,5-Tris(4-chlorophenyl)benzene.

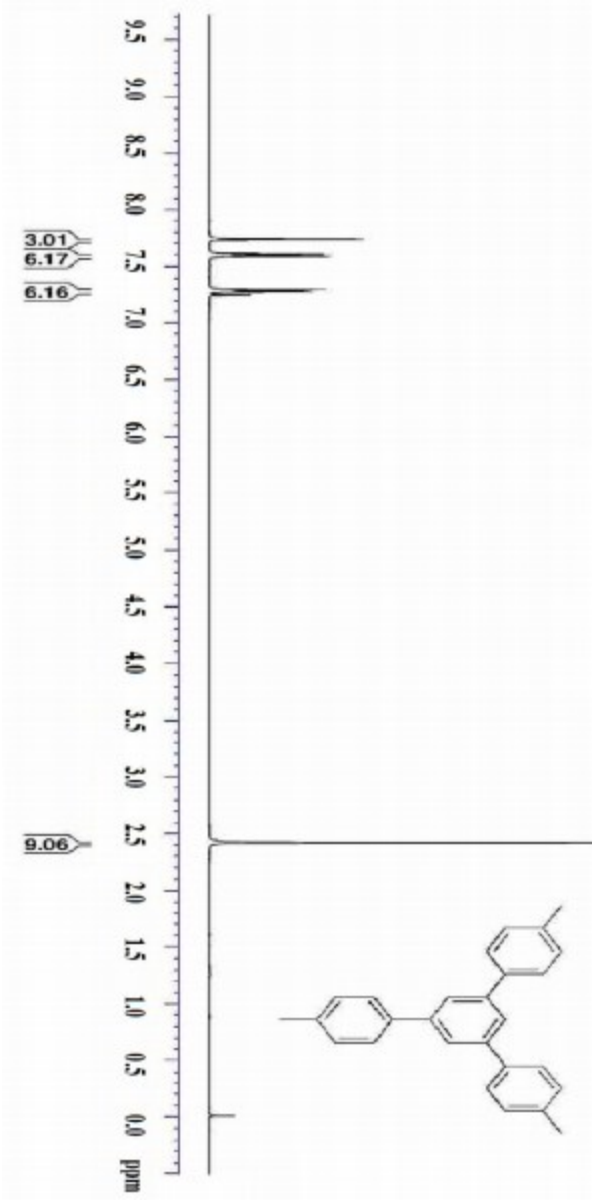


Fig. S10. ^{1}H NMR of 1,3,5-Tris(4-methylphenyl)benzene.

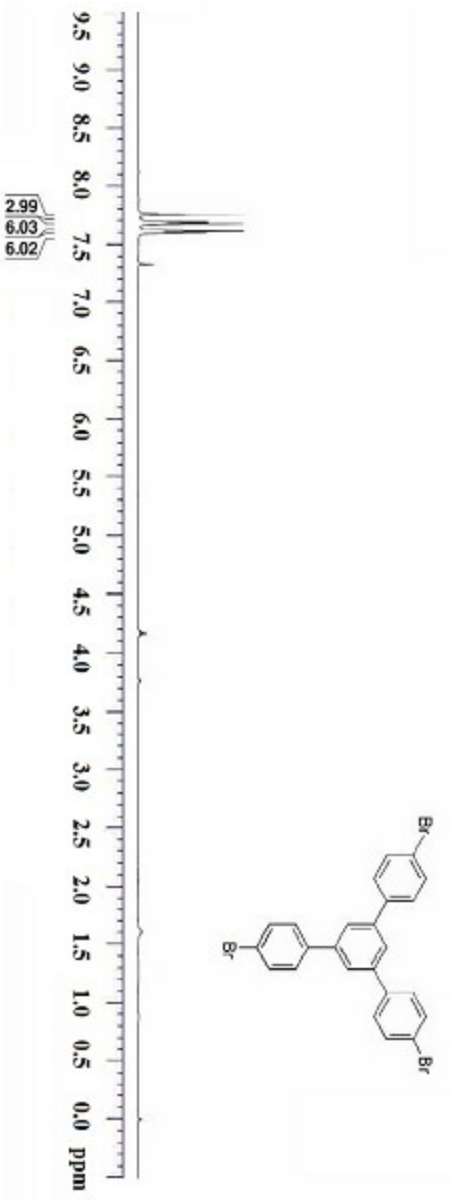


Fig. S11. ^{1}H NMR of 1,3,5-Tris(4-bromophenyl)benzene.

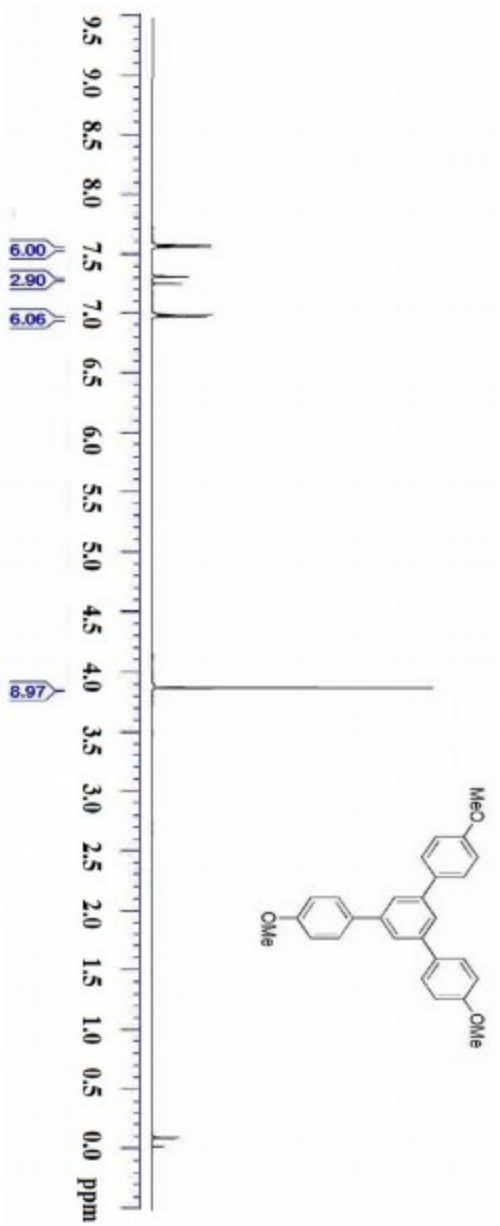


Fig. S12. ^{1}H NMR of 1,3,5-Tris(4-methoxyphenyl)benzene.

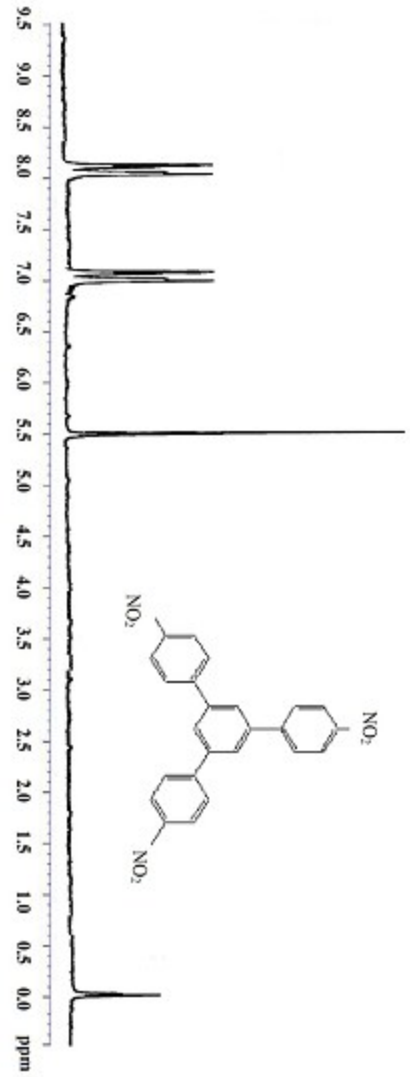


Fig. S13. ^{1}H NMR of 1,3,5-Tris(4-nitrophenyl)benzene.

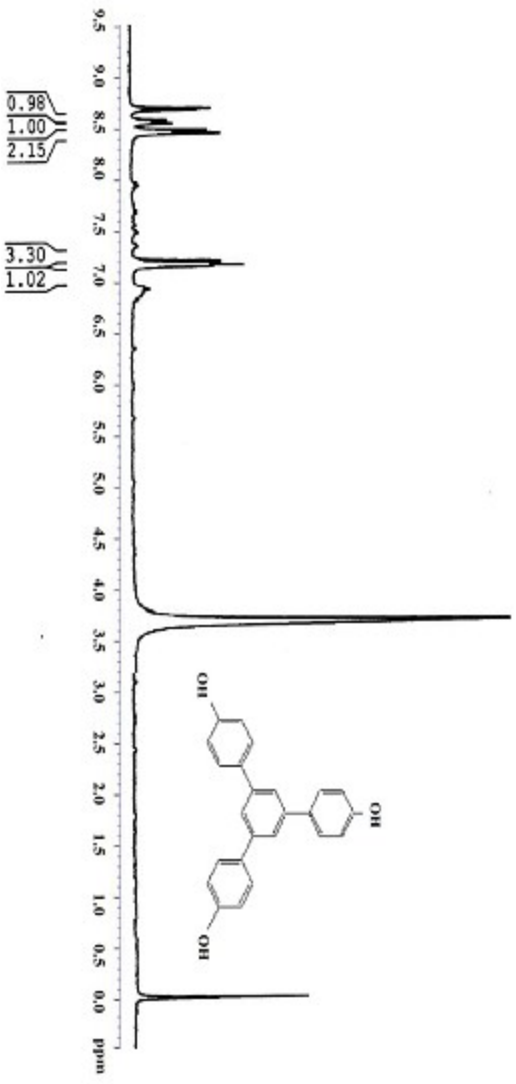


Fig. S14. ^{1}H NMR of 1,3,5-Tris(4-hydroxophenyl)benzene.

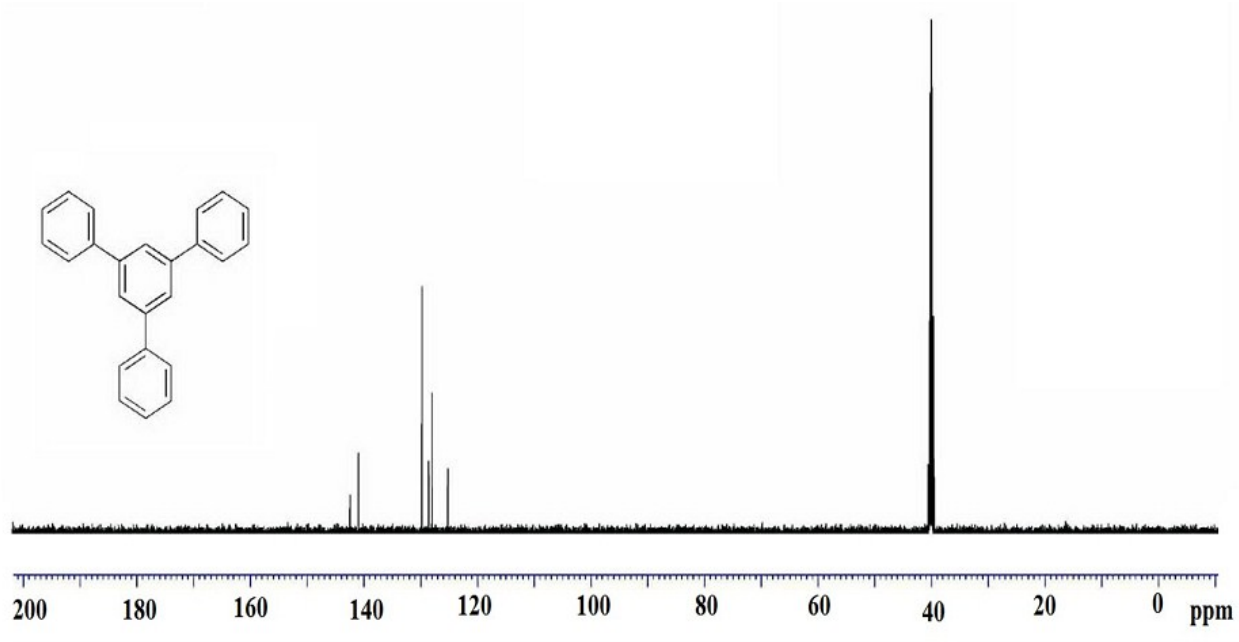


Fig. S15. ^{13}C NMR of 1,3,5-Triphenylbenzene.

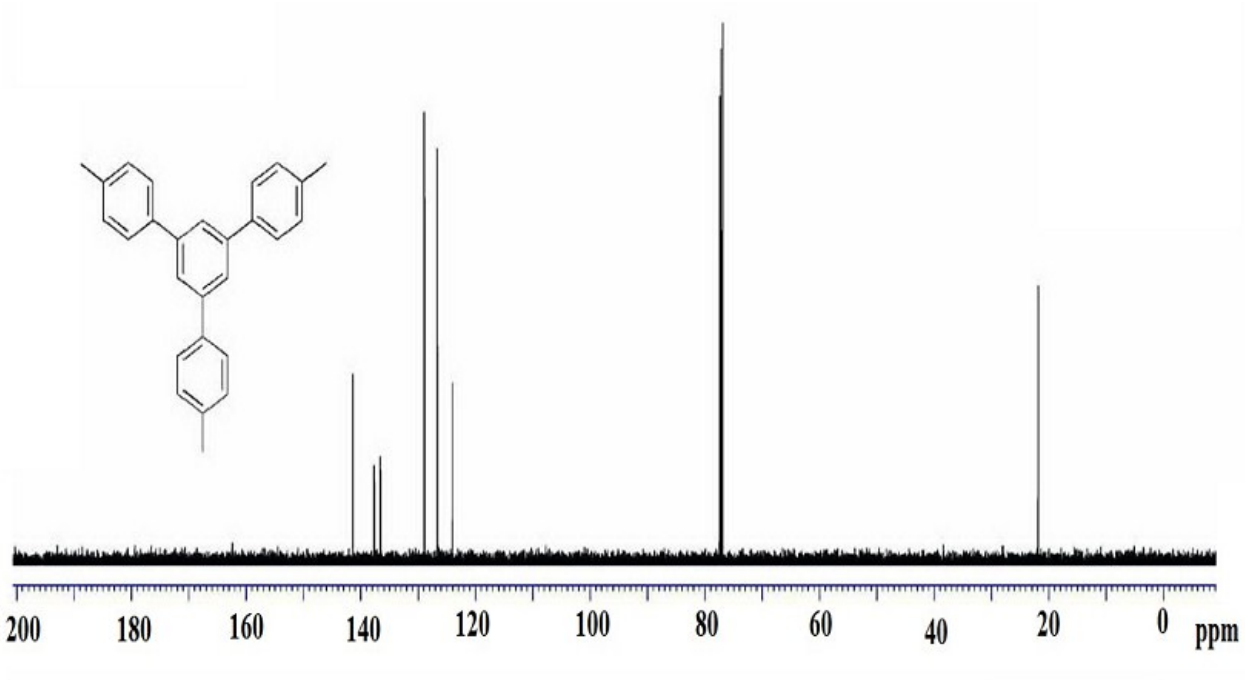


Fig. S16. ^{13}C NMR of 1,3,5-Tris(4-methylphenyl)benzene.

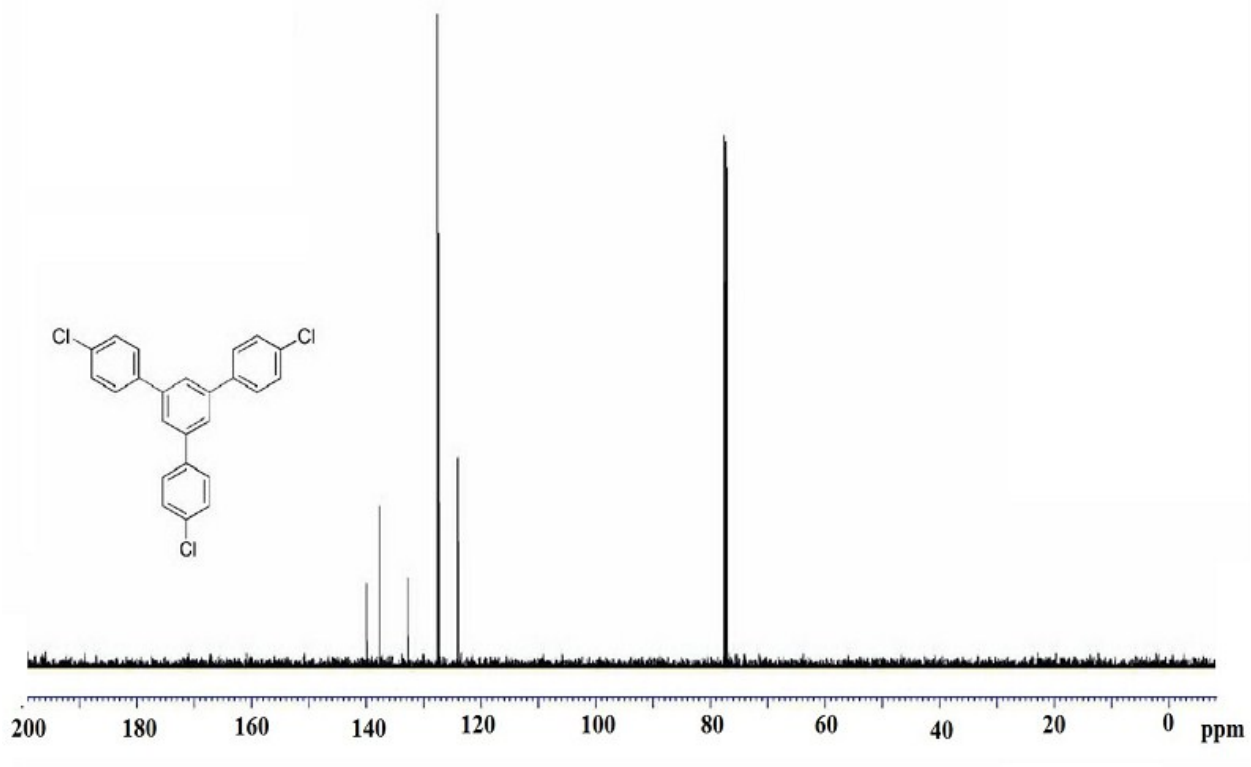


Fig. S17. ^{13}C NMR of 1,3,5-Tris(4-chlorophenyl)benzene.

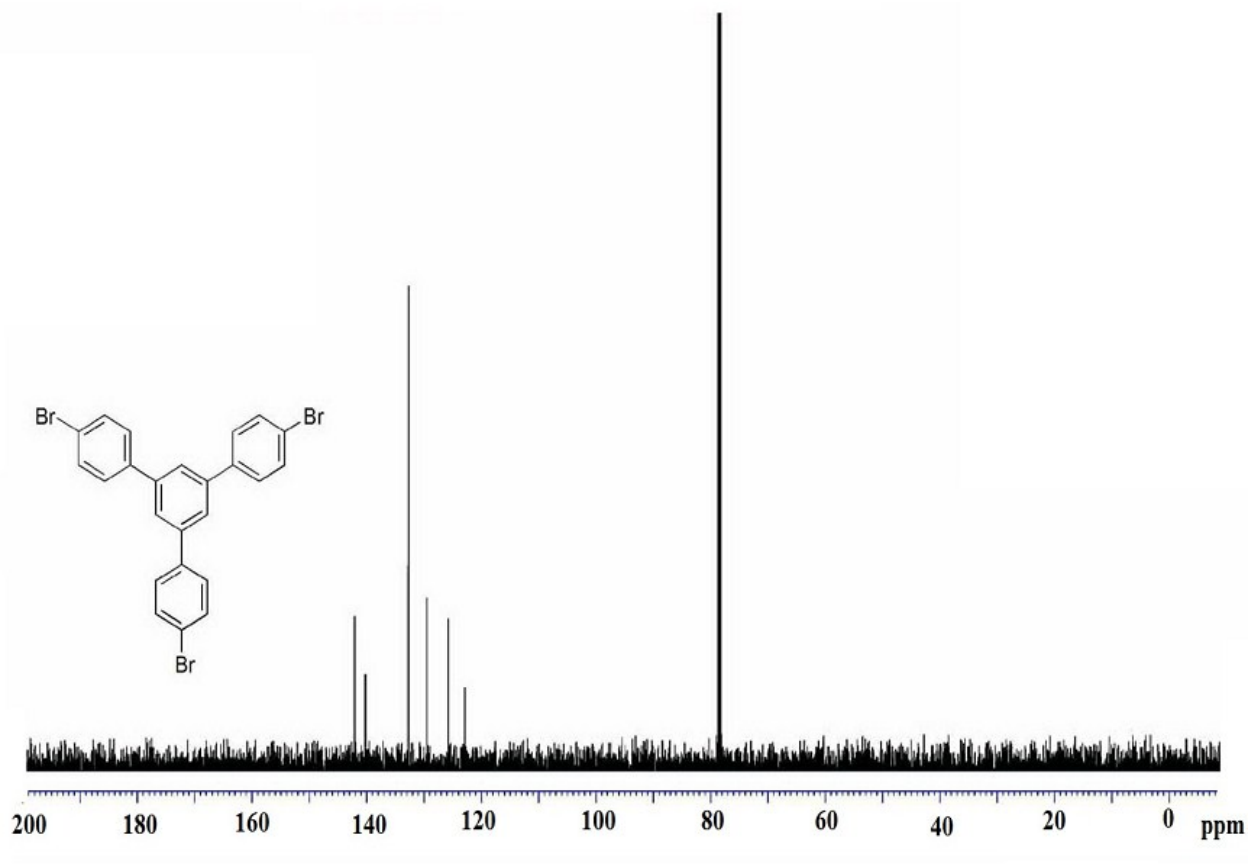


Fig. S18. ^{13}C NMR of 1,3,5-Tris(4-bromophenyl)benzene.

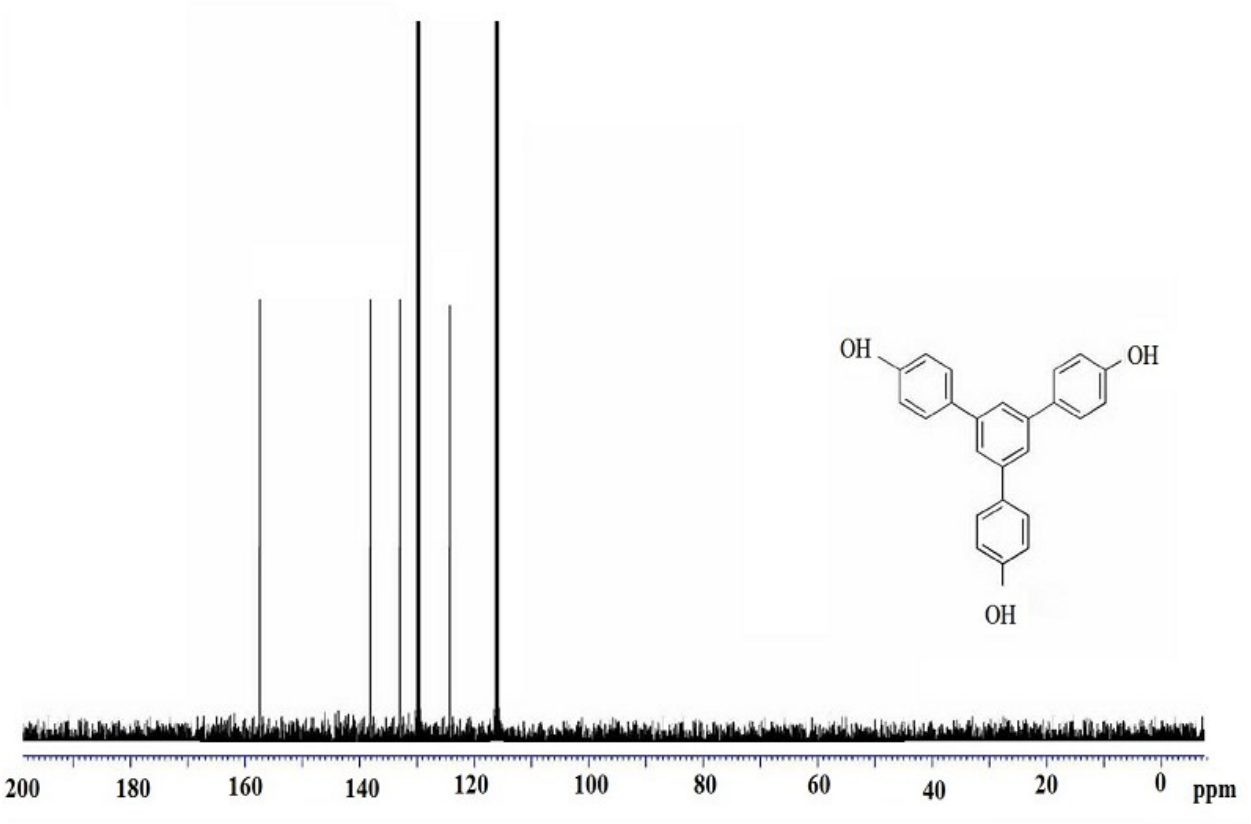


Fig. S19. ^{13}C NMR of 1,3,5-Tris(4-hydroxophenyl)benzene.

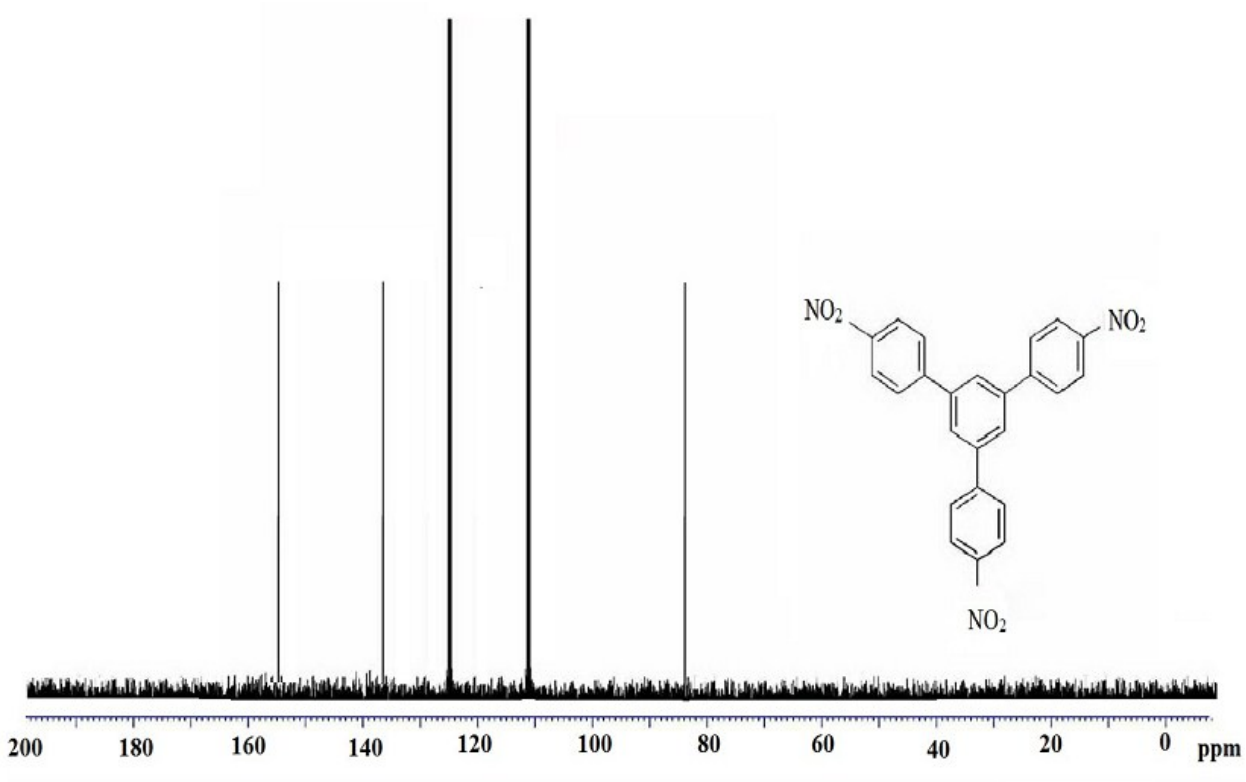


Fig. S20. ^{13}C NMR of 1,3,5-Tris(4-nitrophenyl)benzene.

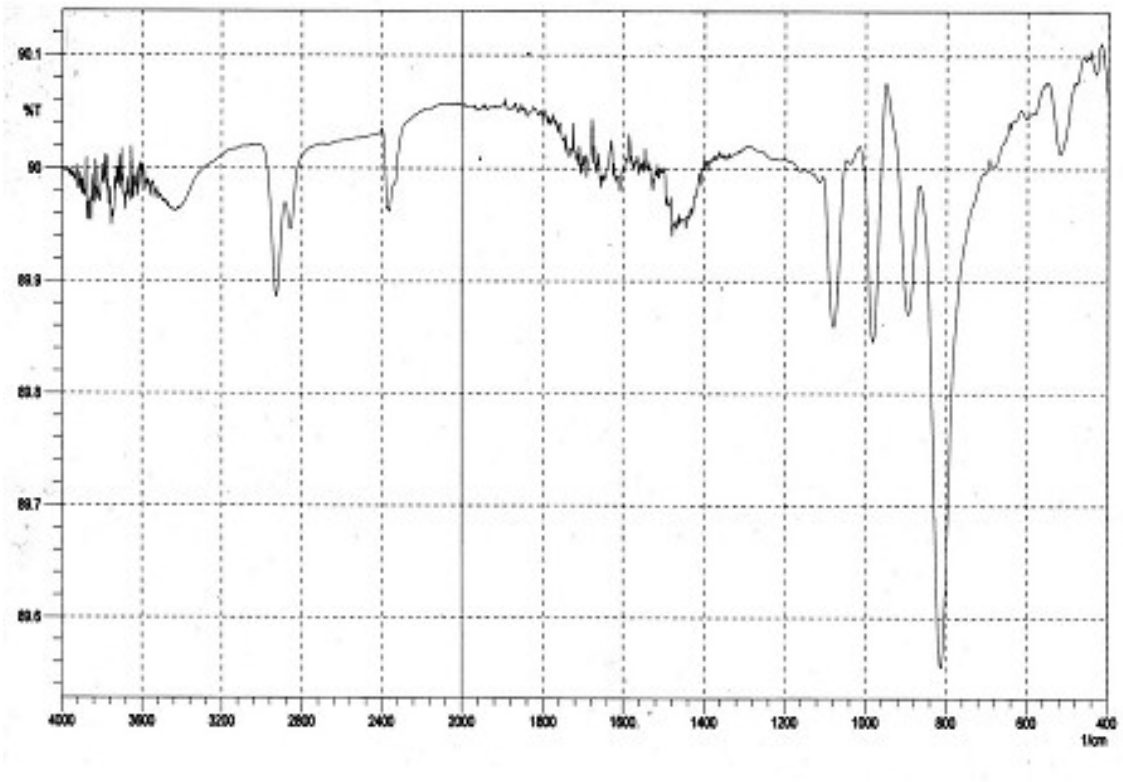


Fig. S21. FT-IR of 1,3,5-Triphenylbenzene.

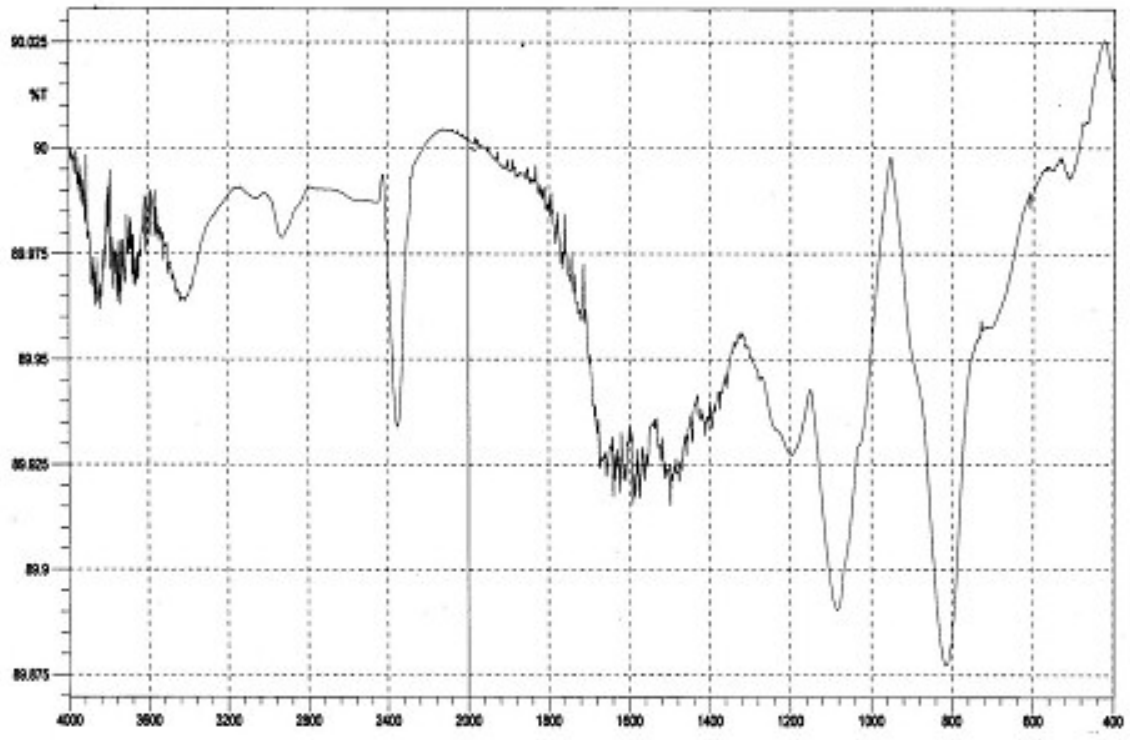


Fig. S22. FT-IR of 1,3,5-Tris(4-chlorophenyl)benzene.

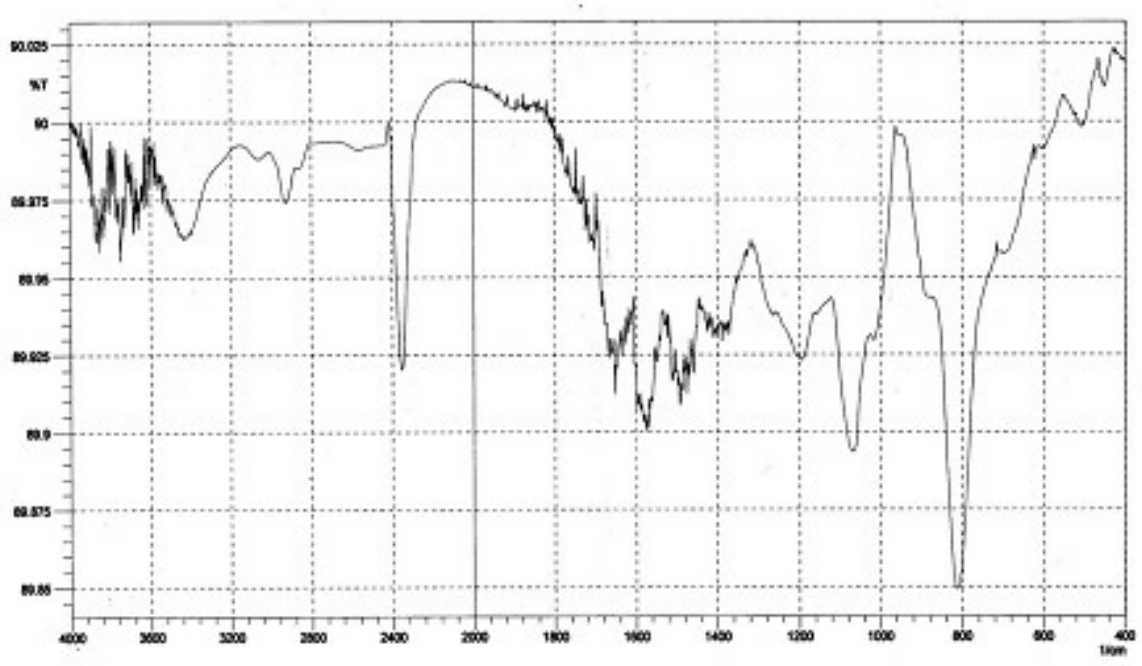


Fig. S23. FT-IR of 1,3,5-Tris(4-bromophenyl)benzene.

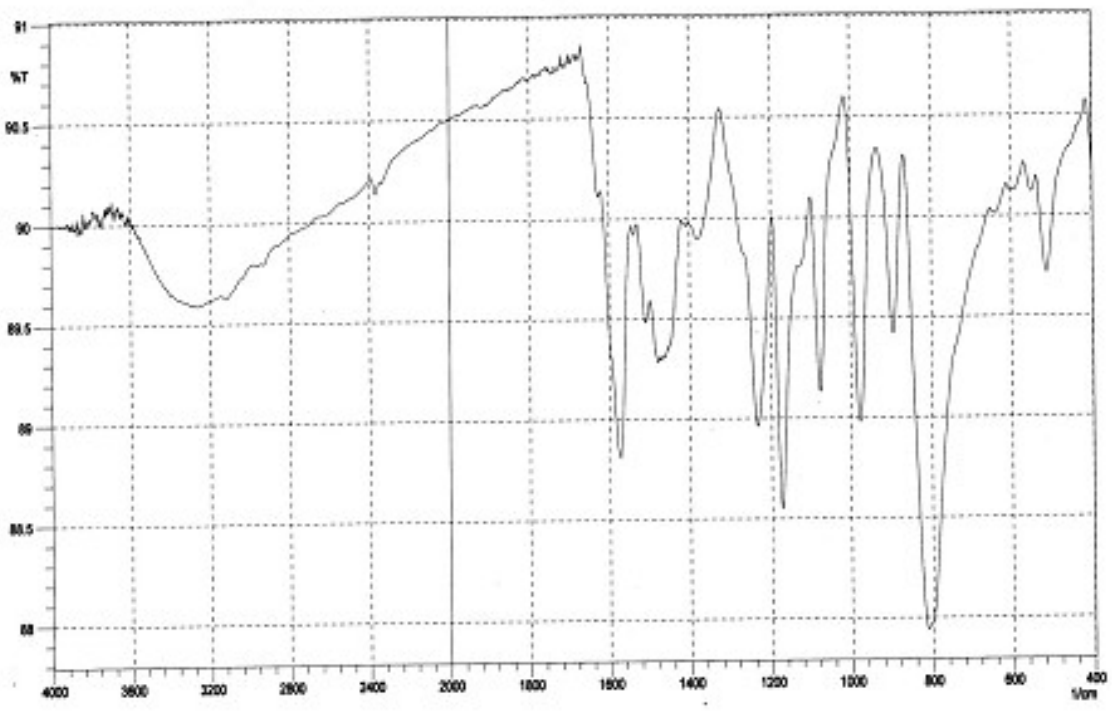


Fig. S24. FT-IR of 1,3,5-Tris(4-hydroxyphenyl)benzene.

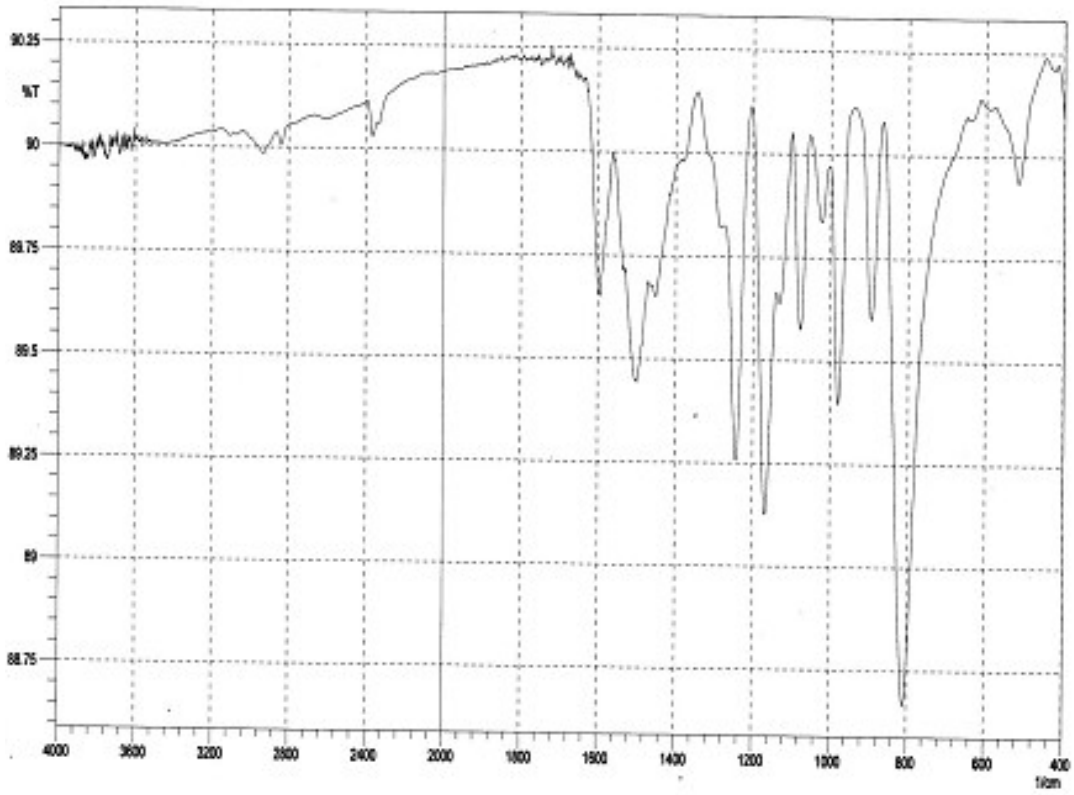


Fig. S25. FT-IR of 1,3,5-Tris(4-methoxyphenyl)benzene.

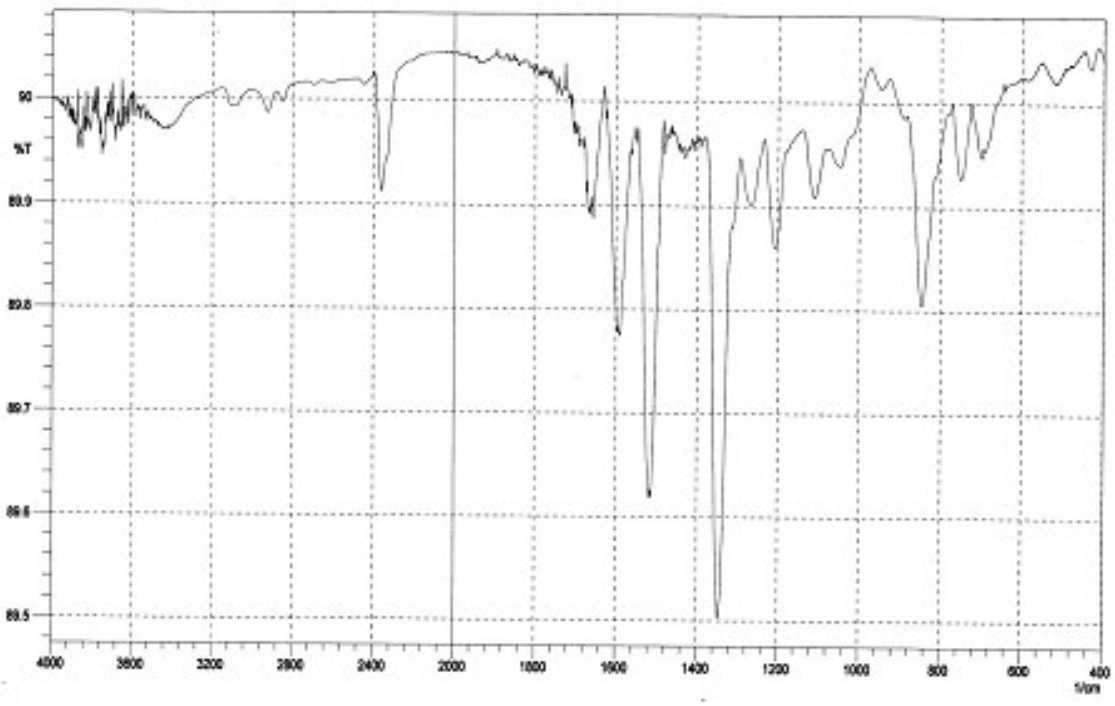


Fig. S26. FT-IR of 1,3,5-Tris(4-nitrophenyl)benzene.

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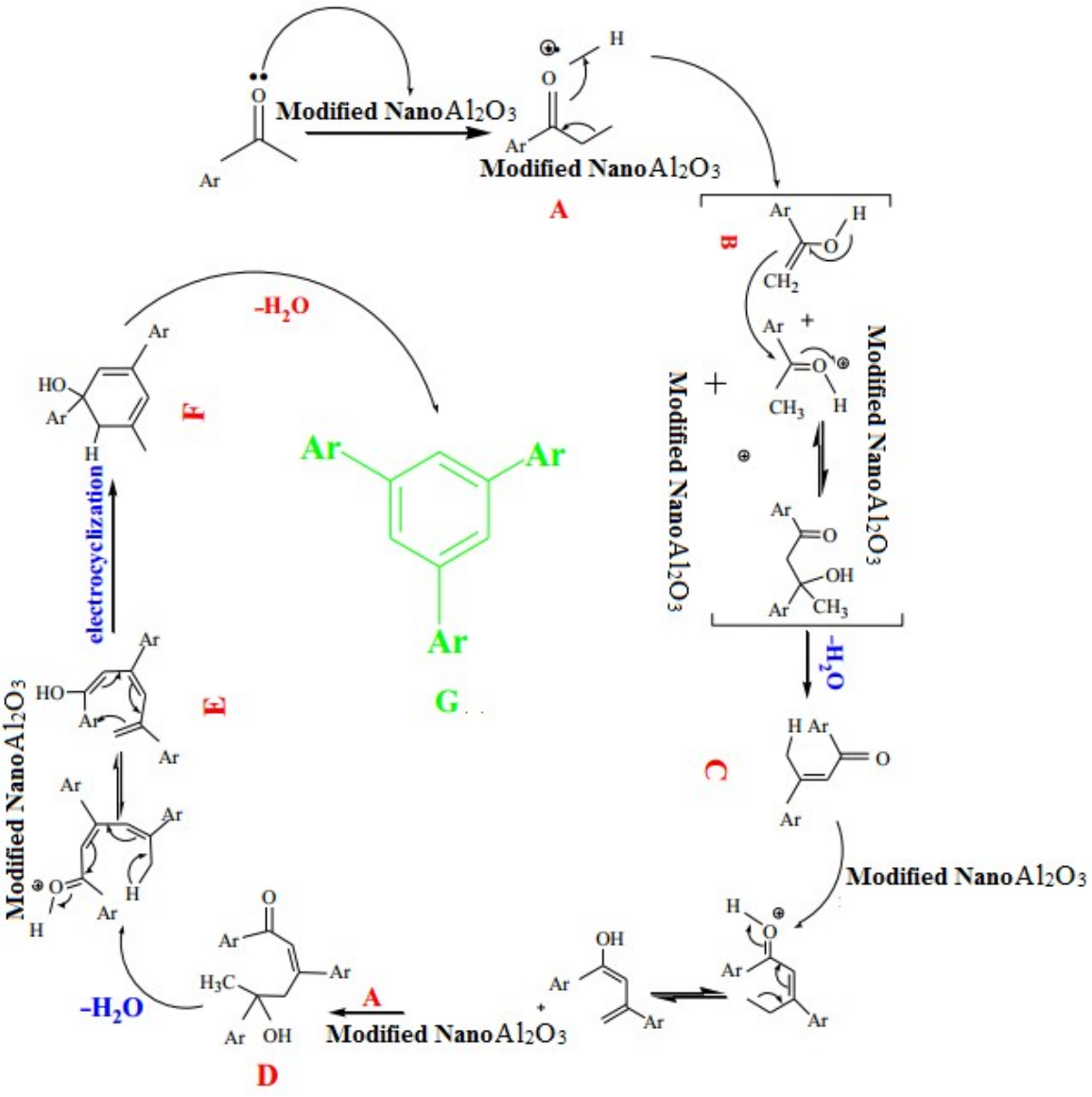
Table S1. Comparison of the correlation coefficient (R^2) for *Langmuir* and *Freundlich* adsorption isotherms.

Langmuir constants		*Freundlich* constants	
a (mg/g)	87.72	k (mg/g)	1.1856
b (1/g)	0.0087	1/n	0.2109
R^2	0.9753	R^2	0.6772

List of Schemes:



Scheme S1. A plausible reaction pathway for the synthesis of 1,3,5-triarylbenzenes by the mediation of γ-Al_2O_3/$H_5PW_{10}V_2O_{40}$.