

Supporting Information

Cu-MOF: An Efficient Heterogeneous Catalyst for the Synthesis of Symmetric Anhydrides *via* C-H Bond Activation of Aldehydes

Zahra Ahmadzadeh,^a Javad Mokhtari,^{*a} and Morteza Rouhani ^a

^a Department of Chemistry, Science and Research Branch, Islamic Azad University, P.O. Box 14515/775, Tehran, Iran. Corresponding author e-mail address: j.mokhtari@srbiau.ac.ir

Selected Spectra Data:

Benzoic anhydride (2a): yield = 82%; Liquid, ^1H NMR (300 MHz, CDCl_3): δ 7.46-7.51 (m, 4H, CH of Ar), 7.60-7.65 (m, 2H, CH of Ar), 8.13 (d, 4H, $^3J = 7.86$ Hz). Anal. Calcd. for $\text{C}_{14}\text{H}_{10}\text{O}_3$ (226.23): C, 74.33; H, 4.46. Found: C, 74.35; H, 4.47.

4-Nitrobenzoic anhydride (2g): yield = 68%; mp: 188-190°C, ^1H NMR (300 MHz, CDCl_3): δ 8.14 (d, 4H, $^3J = 8.9$ Hz, CH of Ar), 8.26 (d, 4H, $^3J = 8.9$ Hz, CH of Ar). Anal. Calcd. for $\text{C}_{14}\text{H}_8\text{N}_2\text{O}_7$ (316.23): C, 53.18; H, 2.55; N, 8.86%. Found: C, 53.21; H, 2.58; N, 8.87%.

4-hydroxy-3-methoxybenzoic anhydride (2l): yield = 73%; ^1H NMR (300 MHz, CDCl_3): δ 3.98 (s, 6H, MeO), 6.17 (bs, 2H, OH), 7.05 (d, 2H, $^3J = 8.4$ Hz, CH of Ar), 7.43-7.45 (m, 4H, CH of Ar). Anal. Calcd. for $\text{C}_{16}\text{H}_{14}\text{O}_7$ (318.28): C, 60.38; H, 4.43. Found: C, 60.4; H, 4.46.

4-hydroxybenzoic anhydride (2k): yield = 70%; ^1H NMR (300 MHz, CDCl_3): δ 5.6 (bs, 2H, OH), 6.95 (d, 4H, $^3J = 8.6$ Hz, CH of Ar), 7.82 (d, 4H, $^3J = 8.6$ Hz, CH of Ar). Anal. Calcd. for $\text{C}_{14}\text{H}_{10}\text{O}_5$ (258.23): C, 65.12; H, 3.90. Found: C, 65.15; H, 3.94.

Isotherm Linear Plot

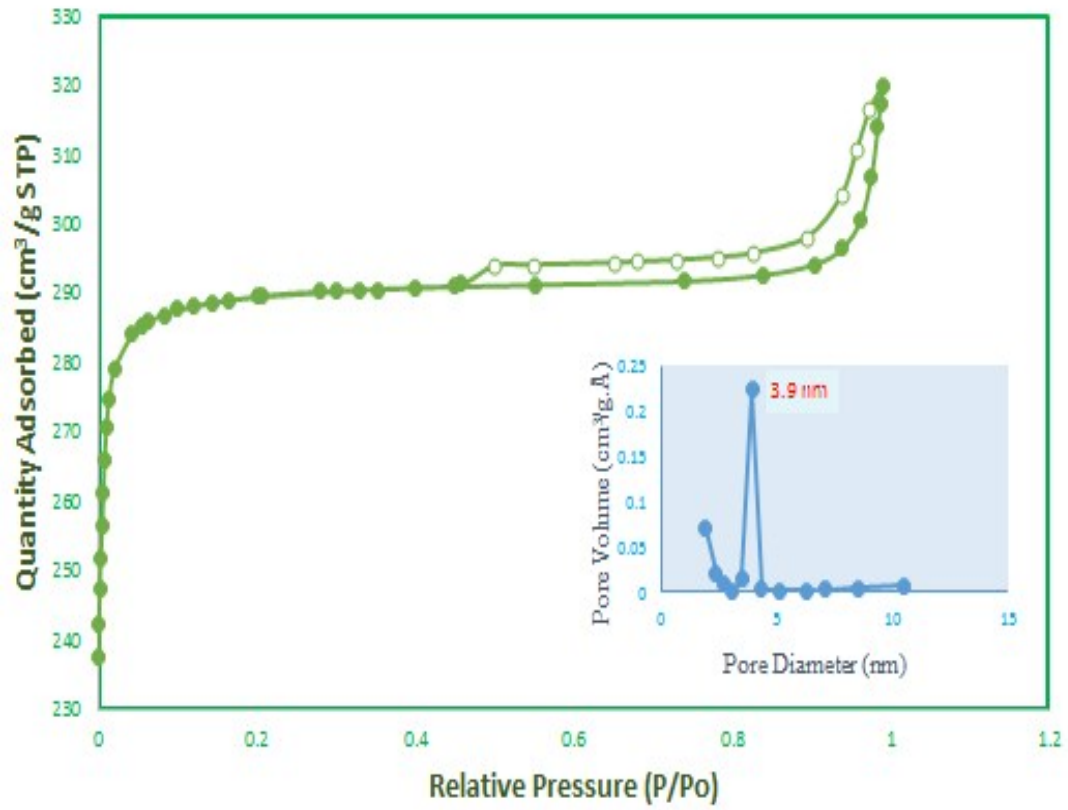


Figure S1. The N₂ adsorption–desorption isotherms of Cu₂(BDC)₂(DABCO)

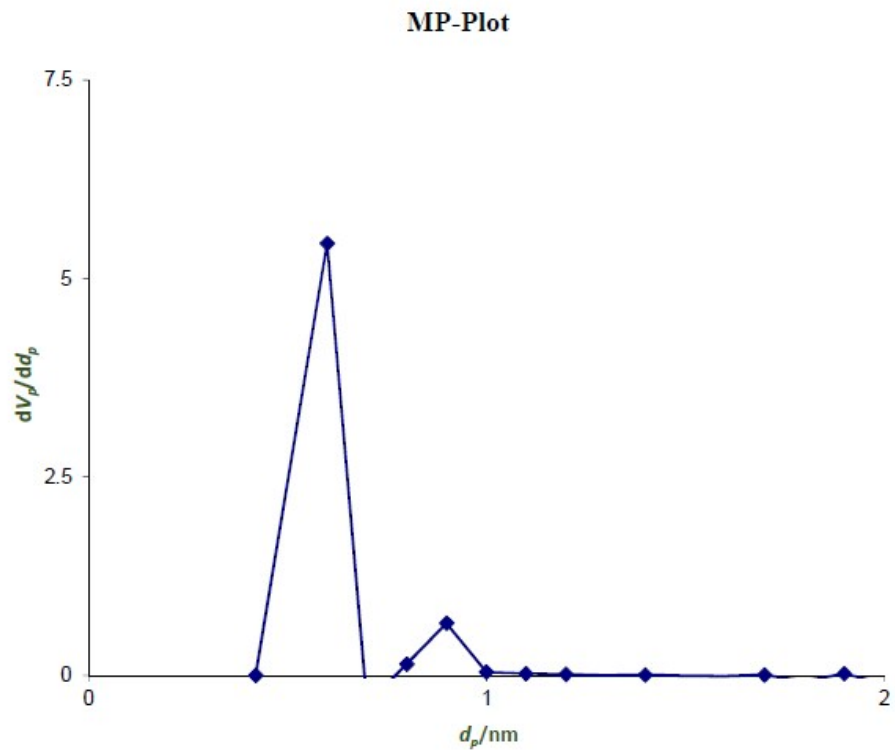


Figure S2. MP-Plot of the synthesized $\text{Cu}_2(\text{BDC})_2(\text{DABCO})$

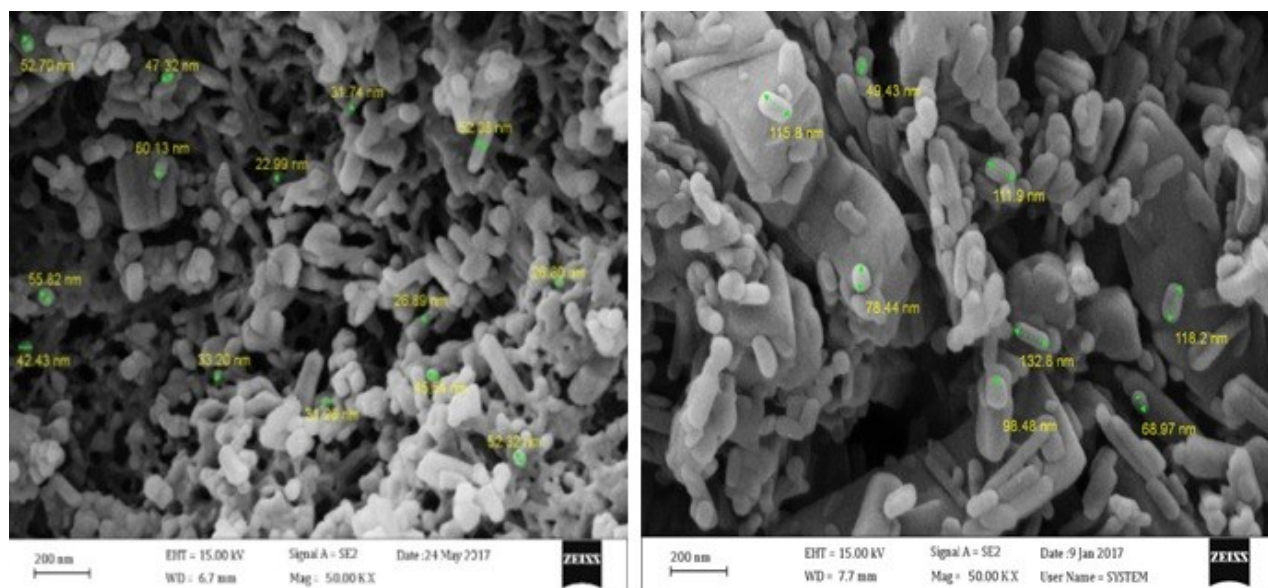


Figure S3. FE-SEM images of fresh $\text{Cu}_2(\text{BDC})_2\text{DABCO}$ (left) and FE-SEM images of recycled $\text{Cu}_2(\text{BDC})_2\text{DABCO}$ (right)

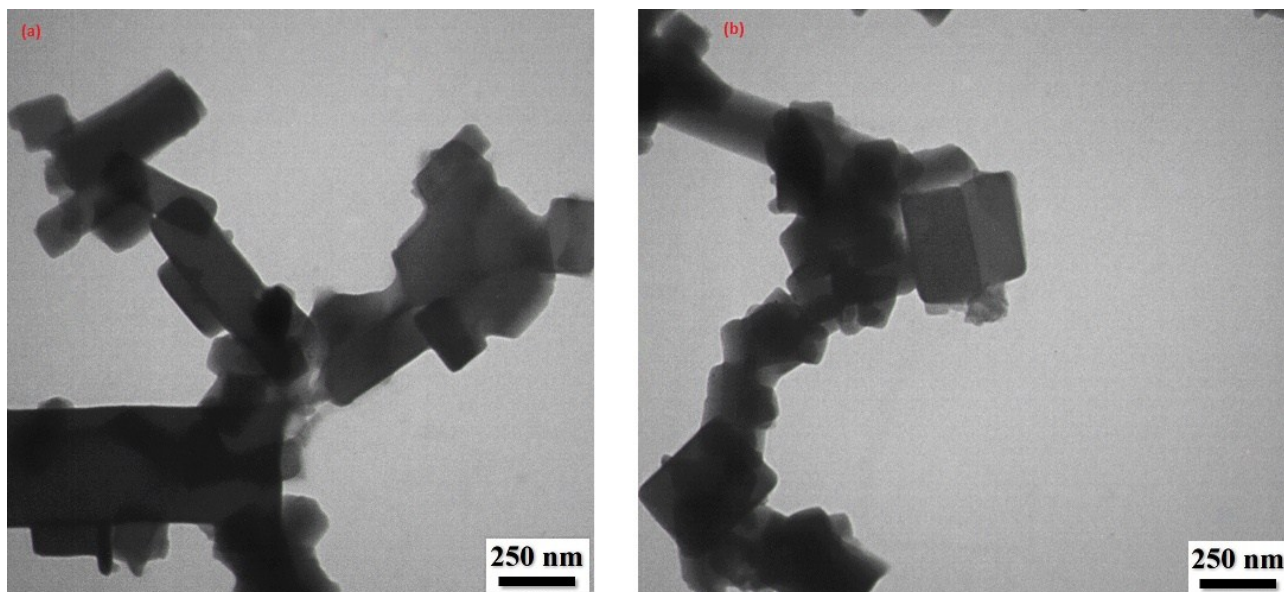


Figure S4. (left) TEM image of fresh $\text{Cu}_2(\text{BDC})_2(\text{DABCO})$. (Right) TEM image of recycled $\text{Cu}_2(\text{BDC})_2(\text{DABCO})$

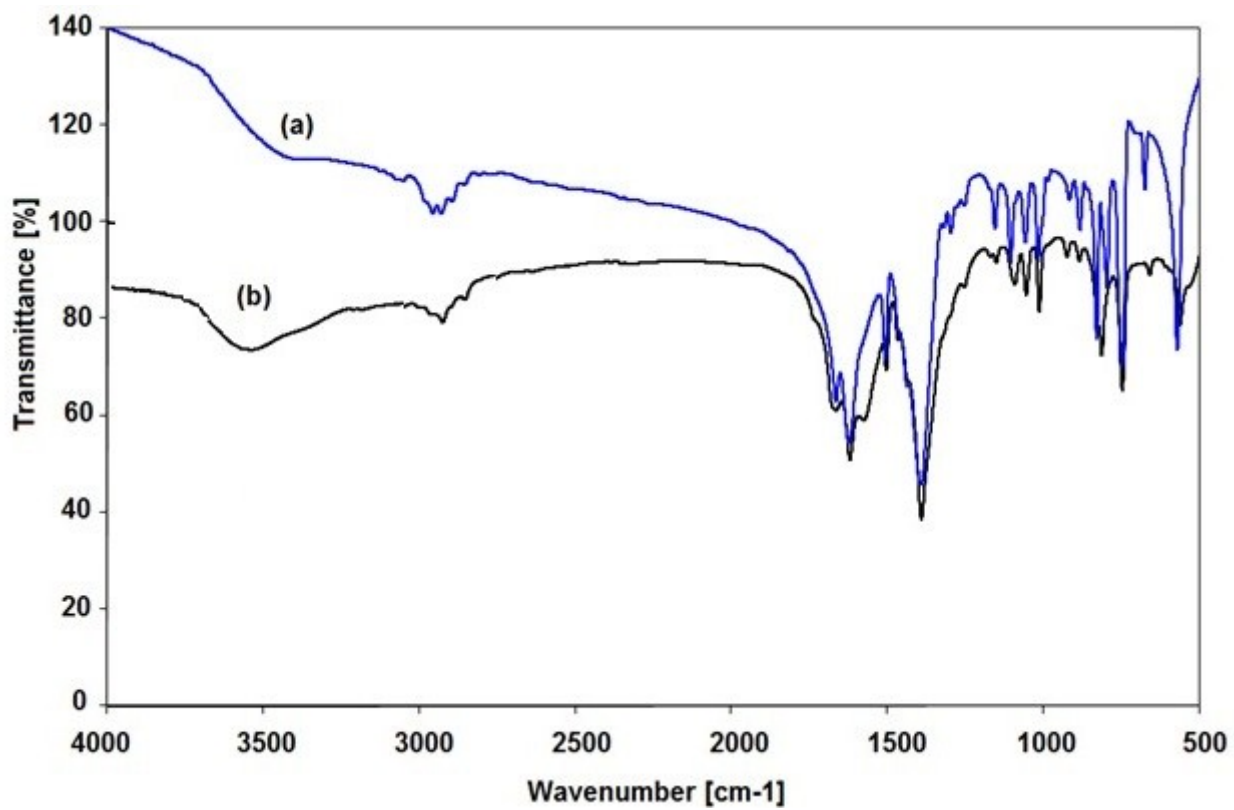


Figure S5. (a) FT-IR of fresh $\text{Cu}_2(\text{BDC})_2(\text{DABCO})$ (b) recycled $\text{Cu}_2(\text{BDC})_2(\text{DABCO})$

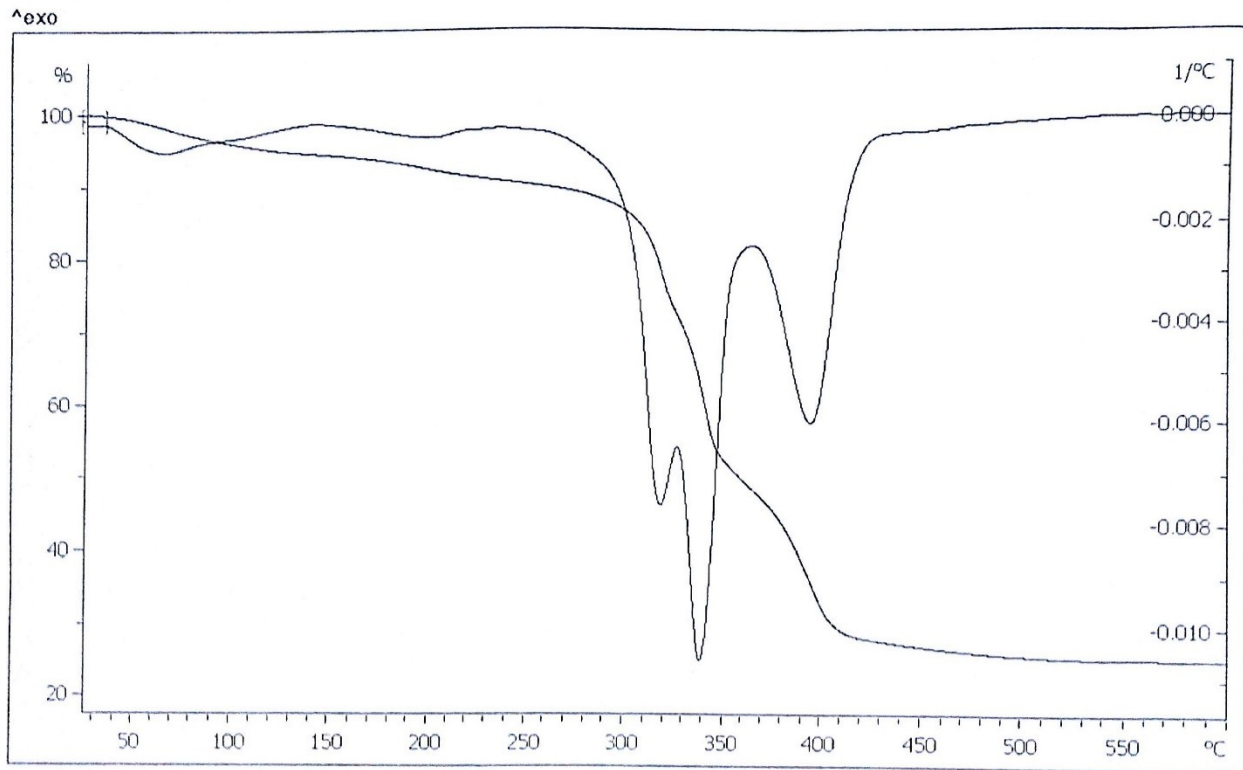


Figure S6. TGA spectra of $\text{Cu}_2(\text{BDC})_2(\text{DABCO})$

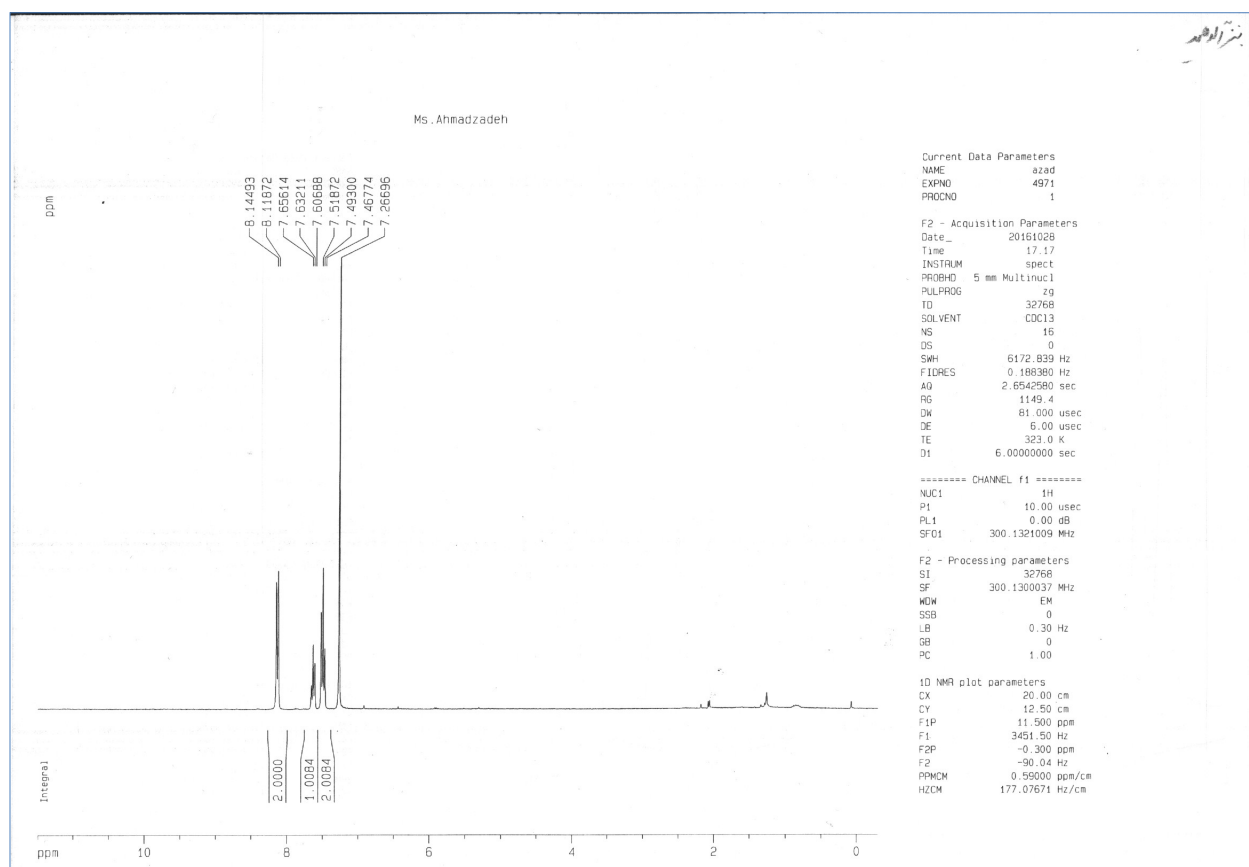


Figure S7. ¹H-NMR of Benzoic anhydride

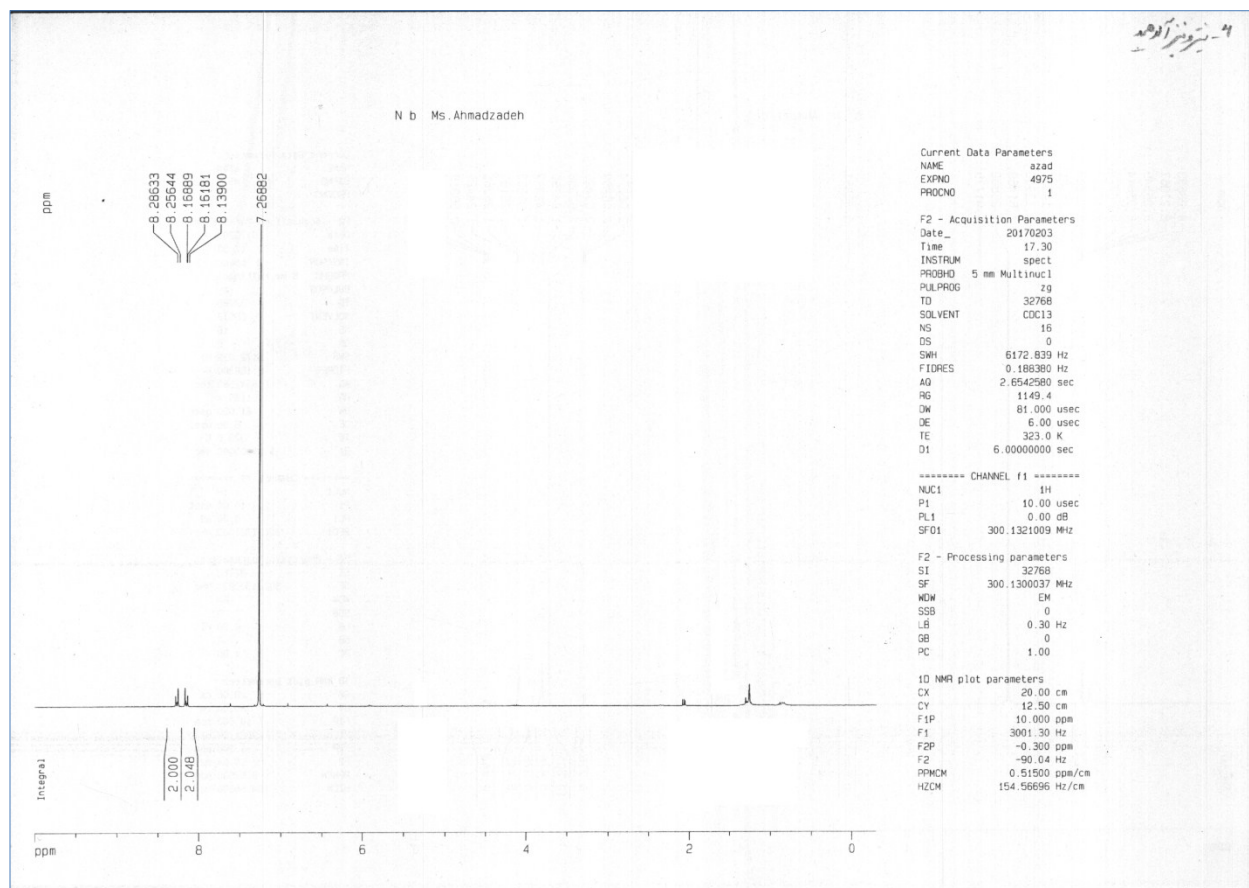


Figure S8. $^1\text{H-NMR}$ of 4-nitrobenzoic anhydride

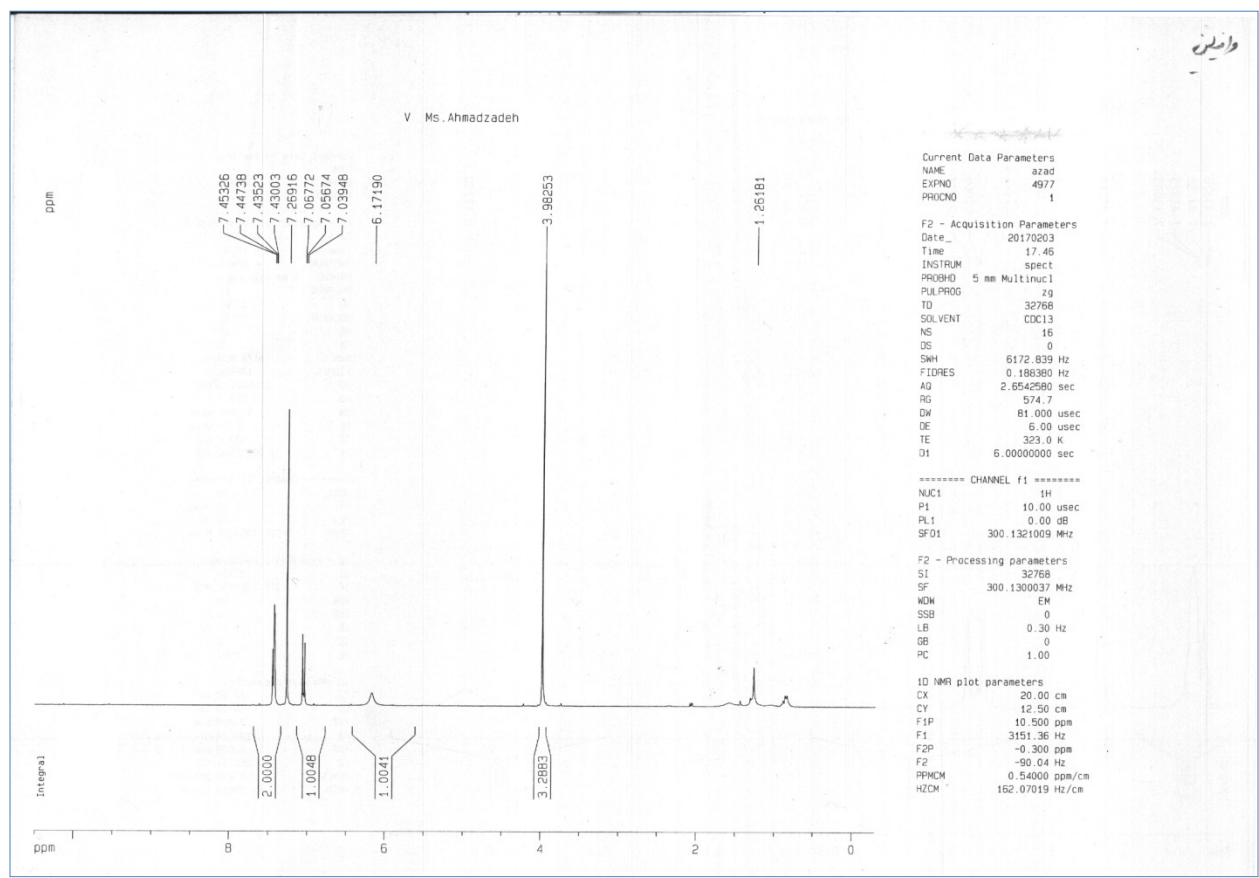


Figure S9. ¹H-NMR of 4-hydroxy-3-methoxybenzoic anhydride

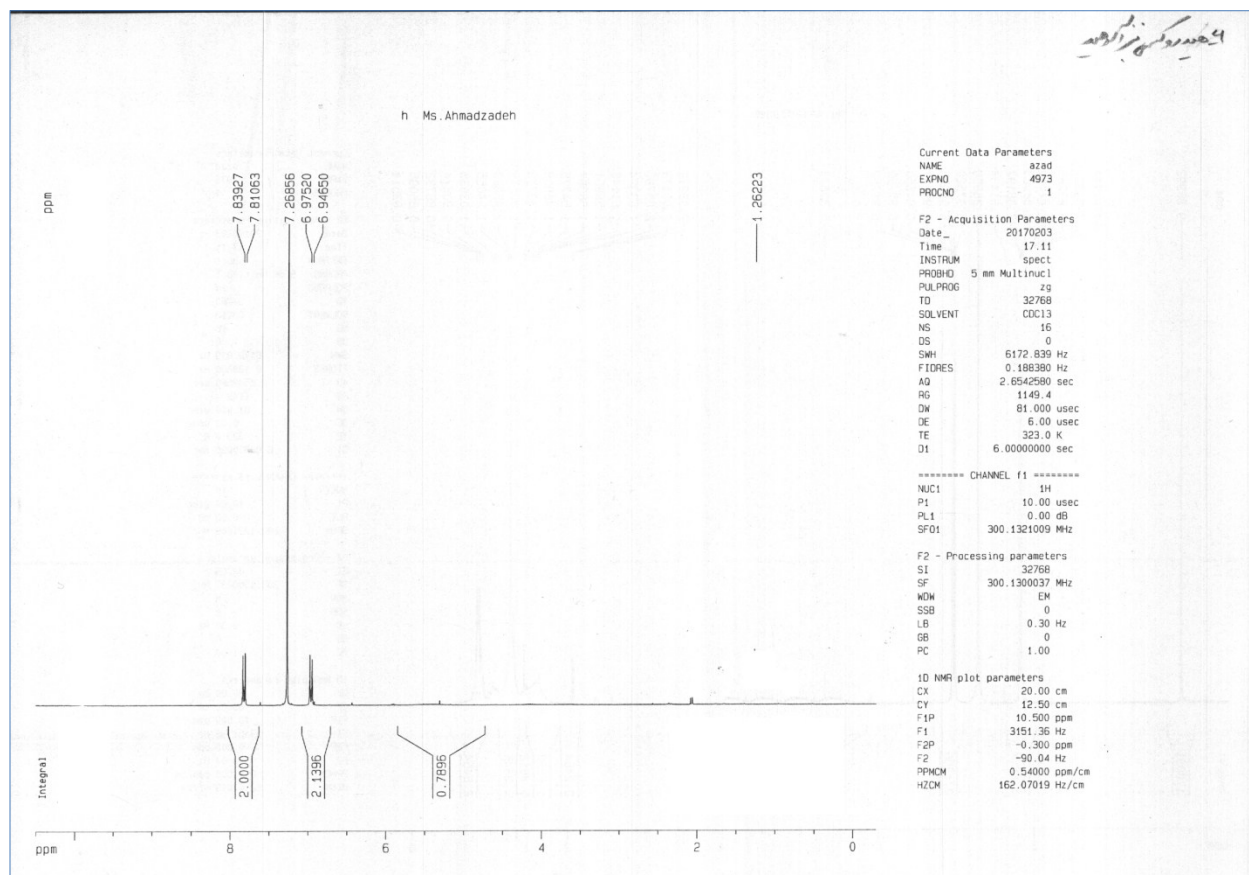


Figure S10. $^1\text{H-NMR}$ of 4-hydroxybenzoic anhydride

