

## 1. Experimental

Materials and methods. All carboxylic acids and the amine were obtained from Sigma Aldrich and were used as received.

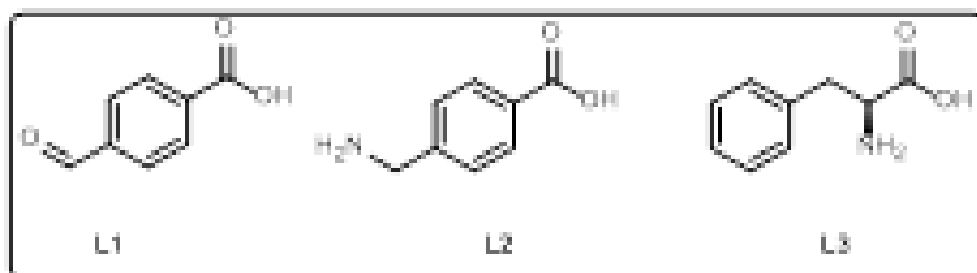
Synthesis of metal oxide NPs: Both iron oxide and magnesium oxide NPs were synthesized as reported in the literature by our research group.

Fe<sub>3</sub>O<sub>4</sub> NPs with L1 is denoted as I

MgO NPs with L1 is denoted as II

Fe<sub>3</sub>O<sub>4</sub> NPs with L2 is denoted as III

MgO NPs with L2 is denoted as IV



## 2. Synthesis of Nanostructured Organic Frame Work (NOF):

The functionalized metal oxide NPs I and III were stirred in solutions of (1:1 mole equiv.) in ethanol and stirring continued for 16 h under refluxing conditions. Later these particles were filtered and washed with ethanol (2 × 10 mL) and dried under vacuum.

In NOFs-D, amine -functionalized MgO was synthesized using (L)-phenylalanine amino acid and aldehyde-functionalized MgO was prepared using 4-formylbenzoic acid in DMF as a solvent.

## 3. Characterization of NOFs:

The chosen carboxylic acids provide functionalized sites of -COOH on the outer edge of the monolayer and the secondary functional groups allow for further chemical and physical reactivity. This functionalization was confirmed by FT-IR and PXRD.

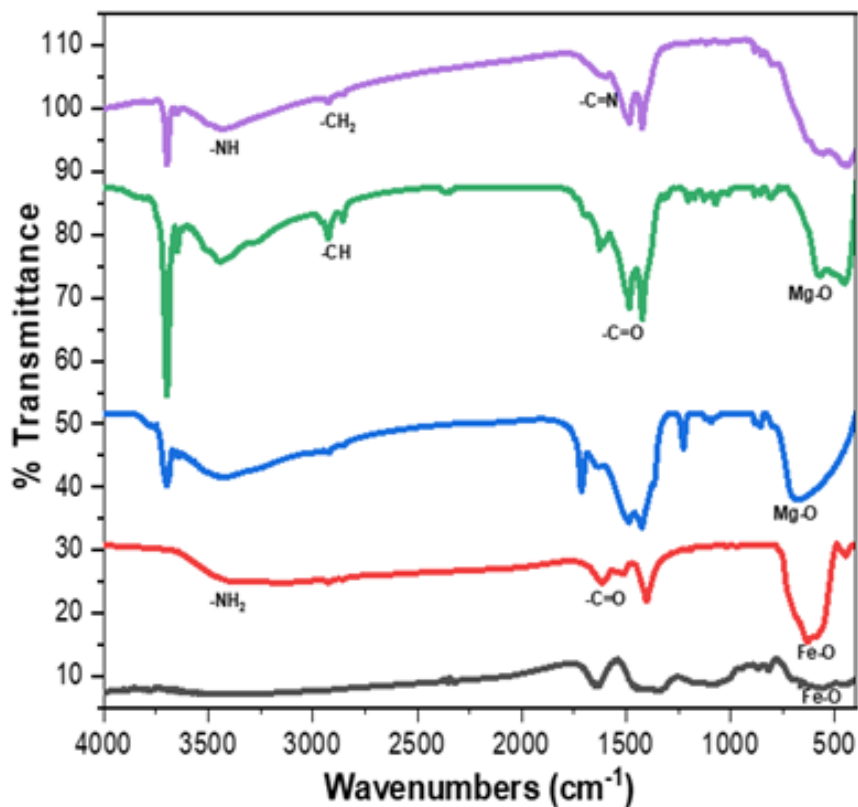


Figure S1 FT-IR spectrum of NOF-A.

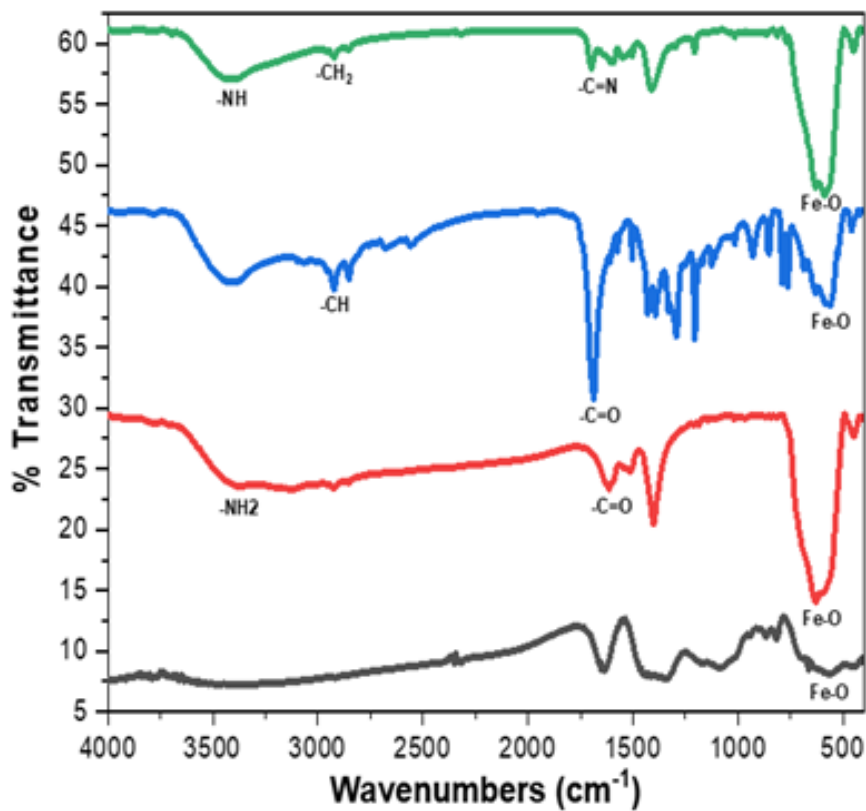


Figure S2 FT-IR spectrum of NOF-B.

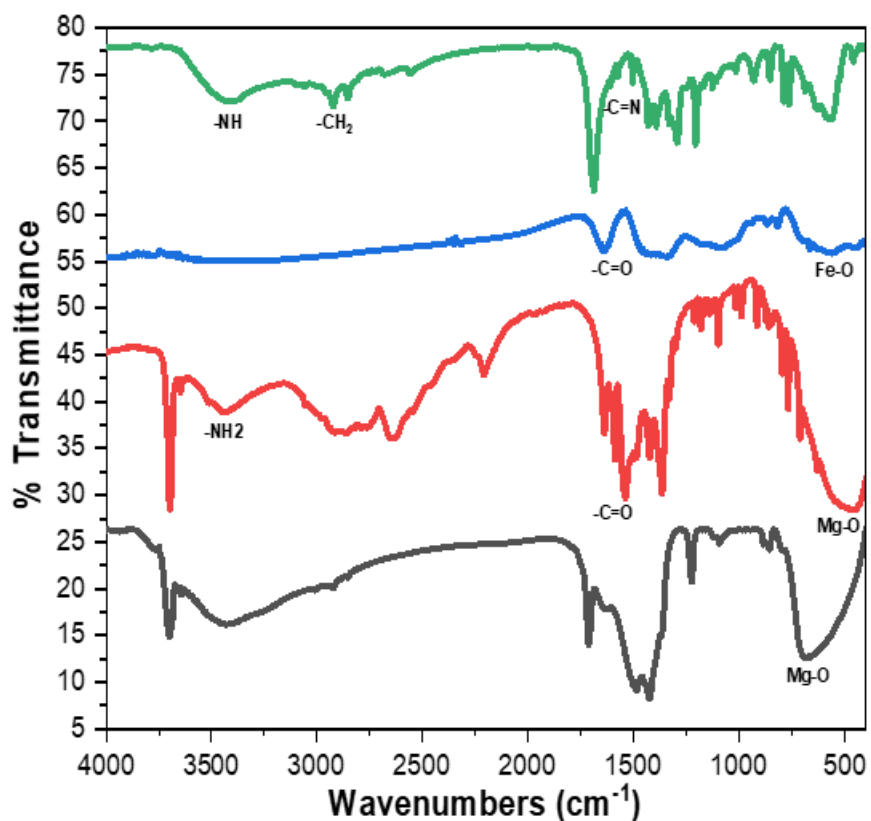


Figure S3 FT-IR spectrum of NOF-C.

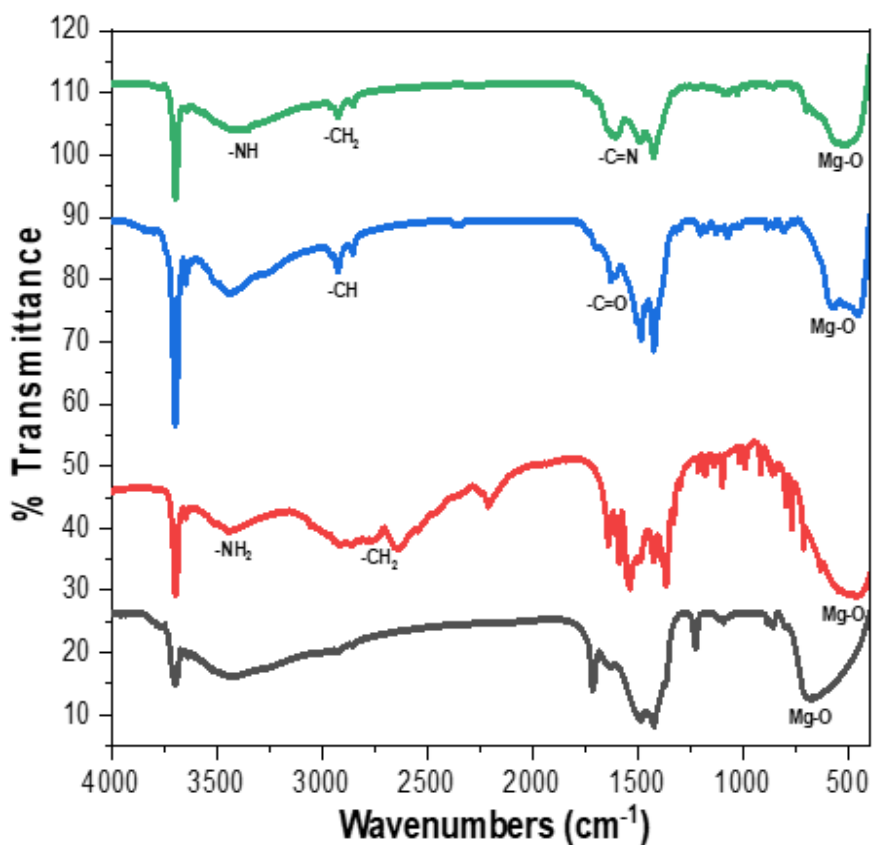
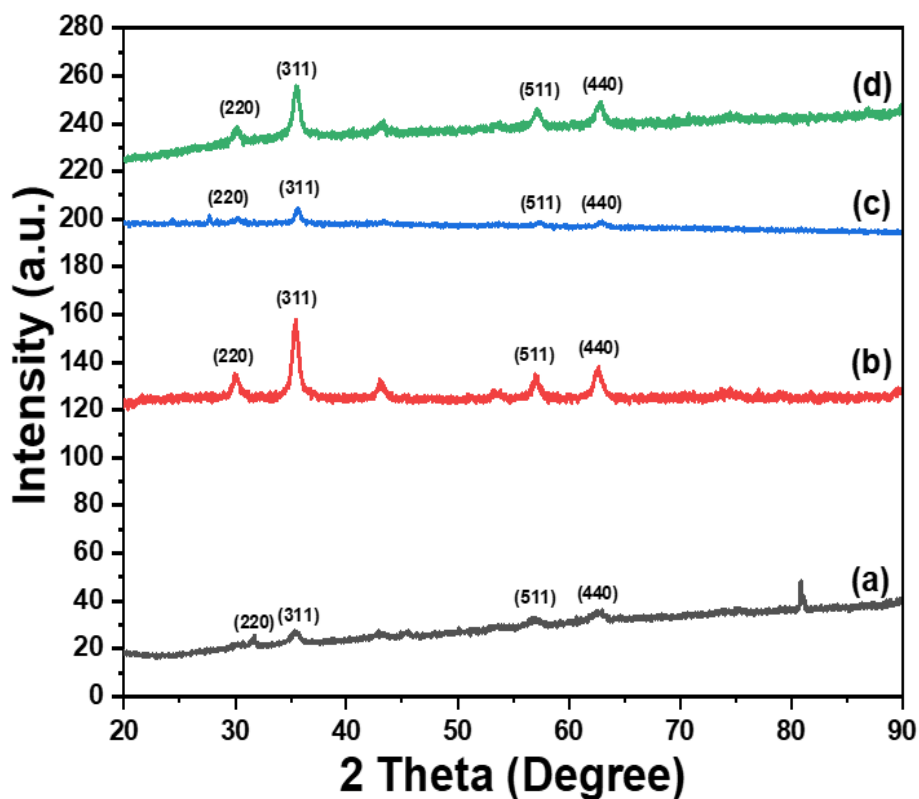
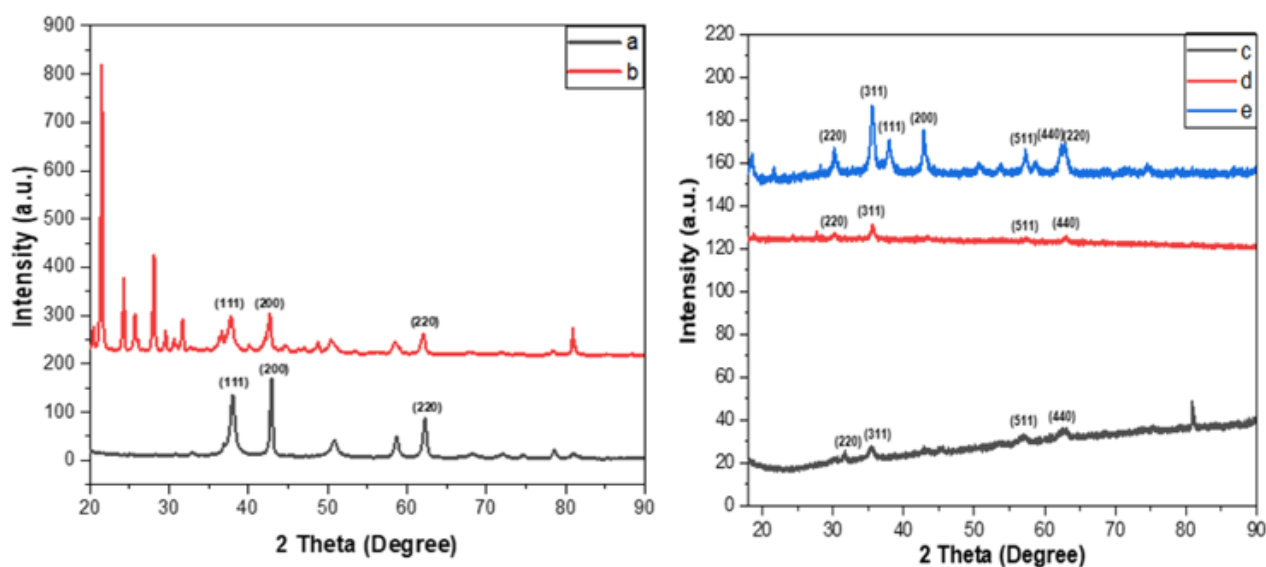


Figure S4 FT-IR spectrum of NOF-D.



**Figure S5** PXR D pattern of (a)  $\text{Fe}_3\text{O}_4$ , (b) amine functionalized  $\text{Fe}_3\text{O}_4$ , (c) aldehyde functionalized  $\text{Fe}_3\text{O}_4$  and (d) NOF-B.



**Figure S6** PXR D pattern of (a)  $\text{MgO}$  (b) amine functionalized  $\text{MgO}$  (c)  $\text{Fe}_3\text{O}_4$  (d) aldehyde functionalized  $\text{Fe}_3\text{O}_4$  and (e) NOFs-C.

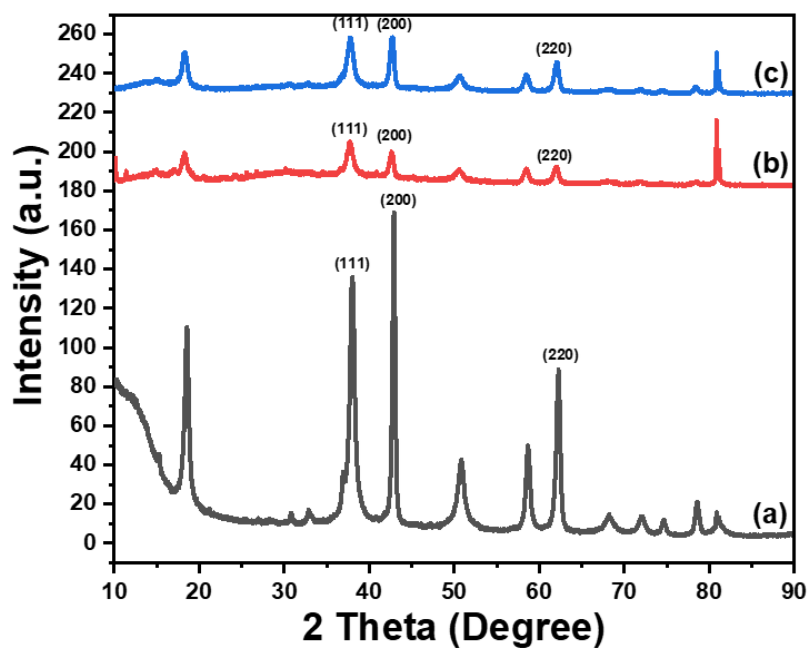


Figure S7 XRD pattern of (a) (*L*)-phenylalanine functionalized MgO (b) aldehyde functionalized MgO and (c) NOFs-D.

### 3B. TGA Curves of NOFs

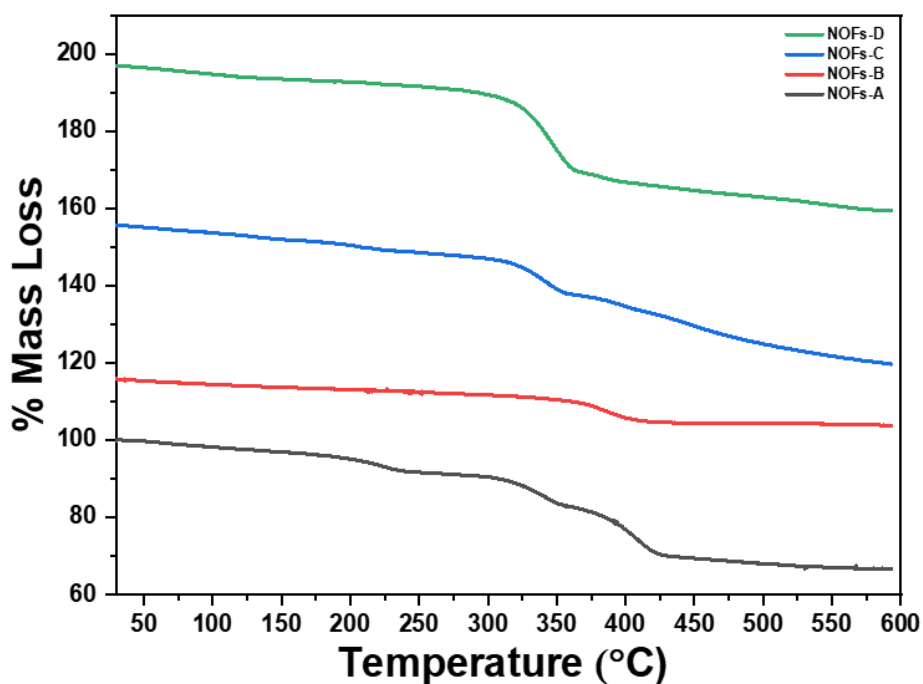


Figure S8 TGA plots of NOFs.

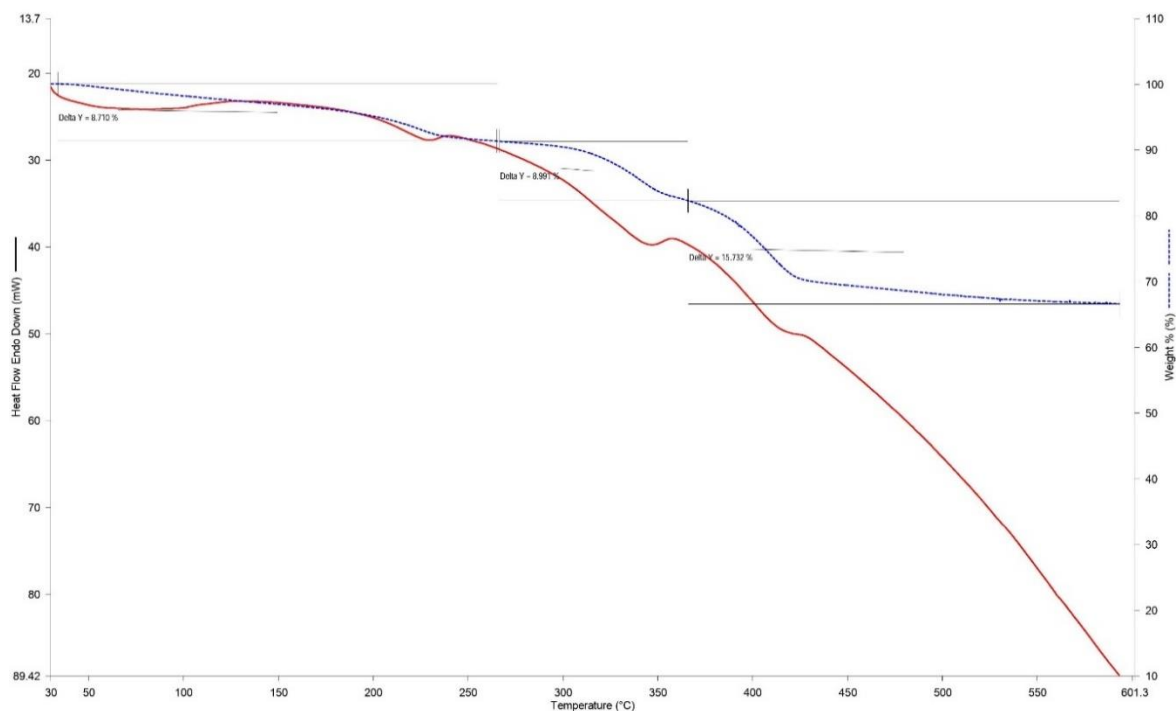


Figure S9 TGA and DTA of NOF-A.

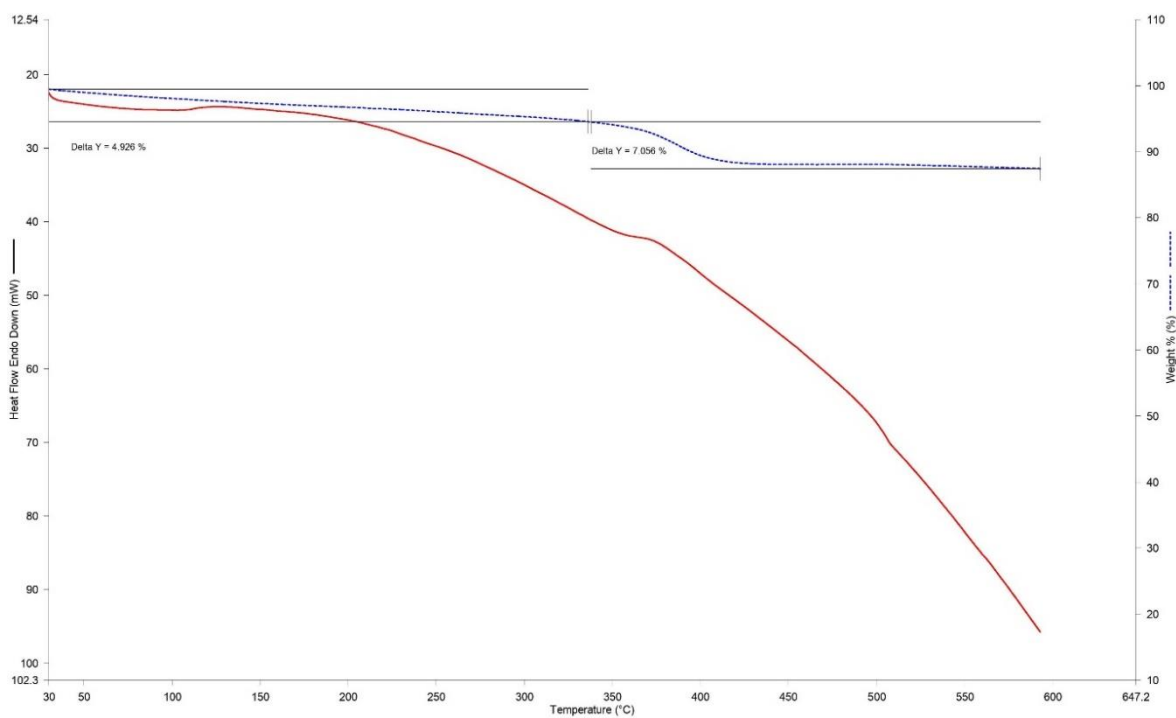


Figure S10 TGA and DTA of NOF-B.

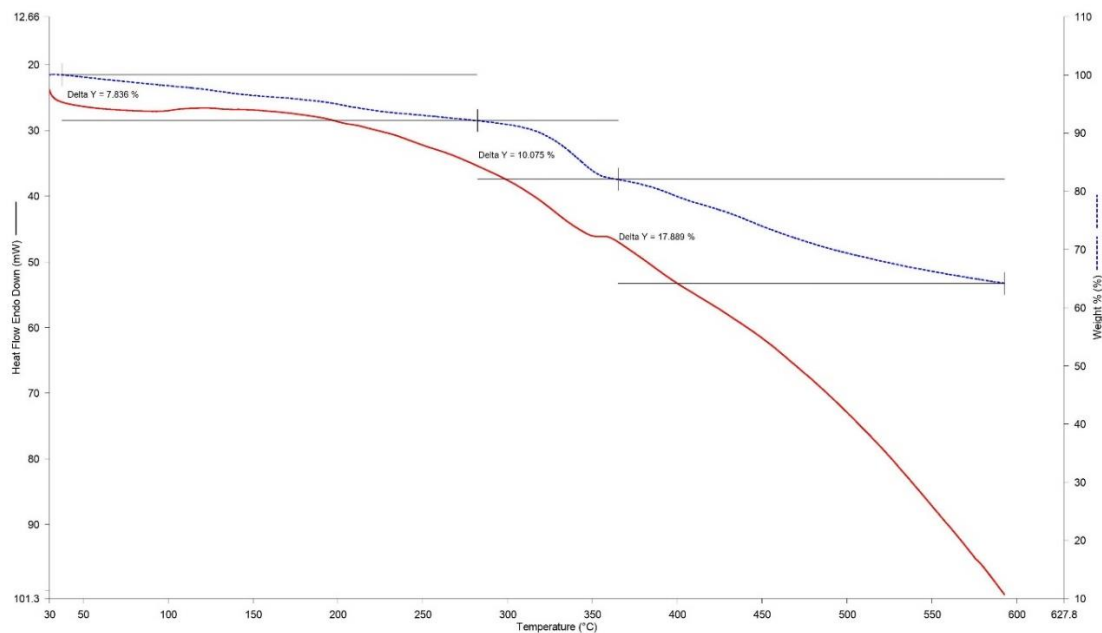


Figure S11 TGA and DTA of NOF-C.

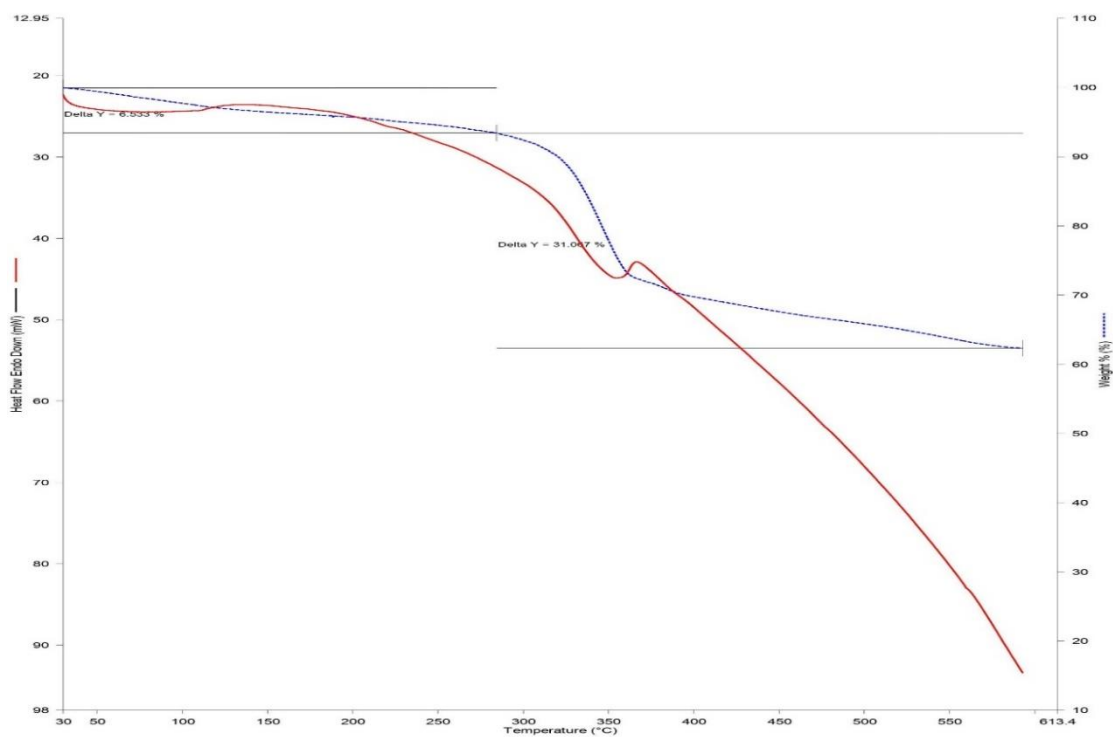


Figure S12 TGA and DTA of NOF-D.

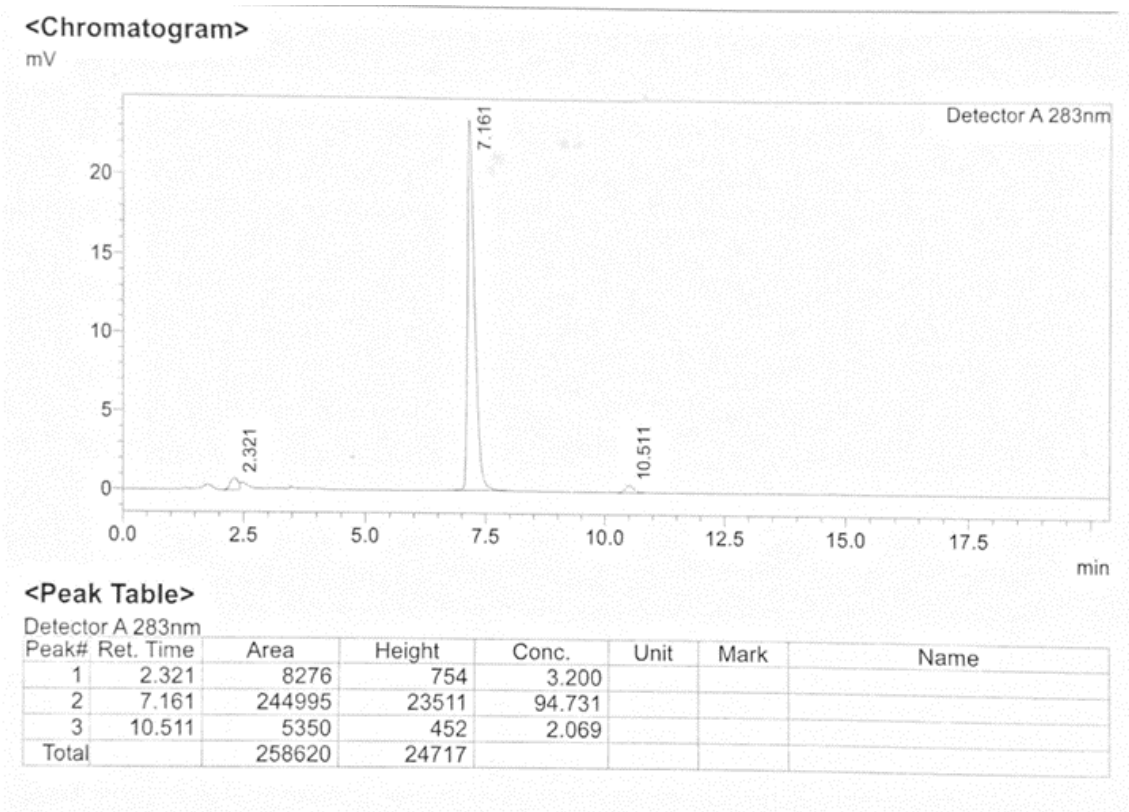


Figure S13 HPLC spectra of glucose decomposition using NOF-A.

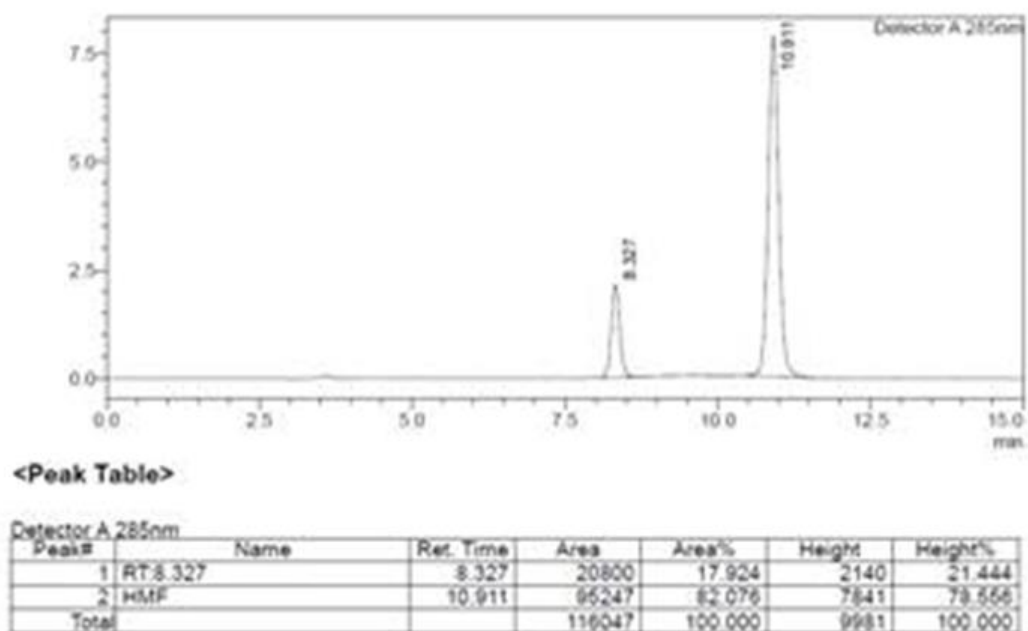


Figure S14 HPLC spectra of glucose decomposition using NOF-B.



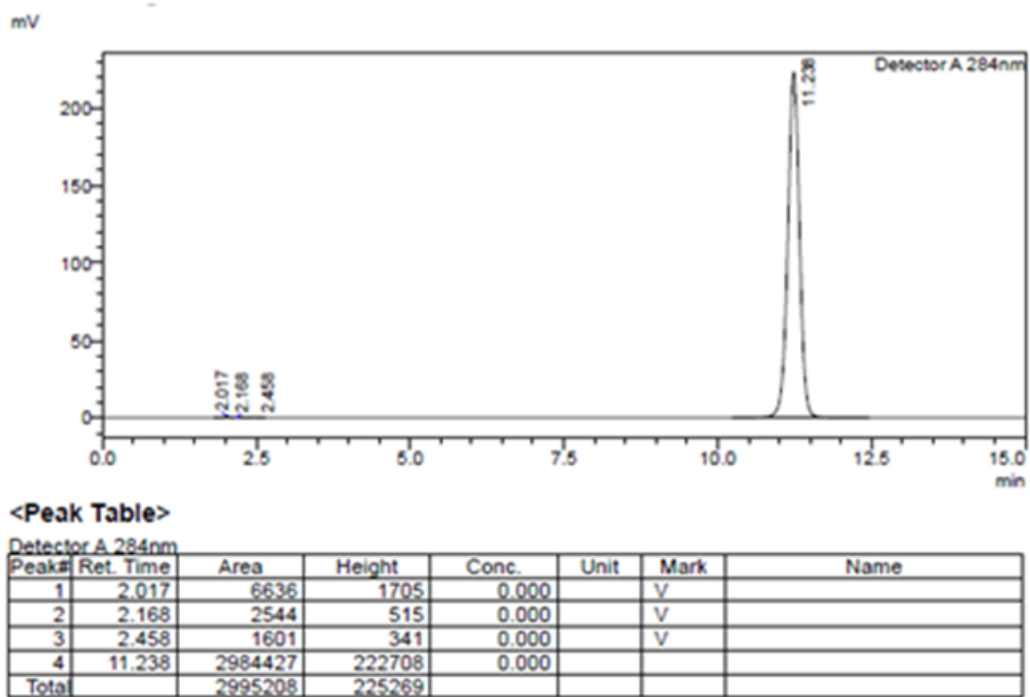


Figure S15 HPLC spectra of glucose decomposition using NOF-B.