Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supporting Information

Insight into Enzymatic Degradation of Physically Crosslinked Hydrogels Anchored by Functionalized Carbon Nanofillers

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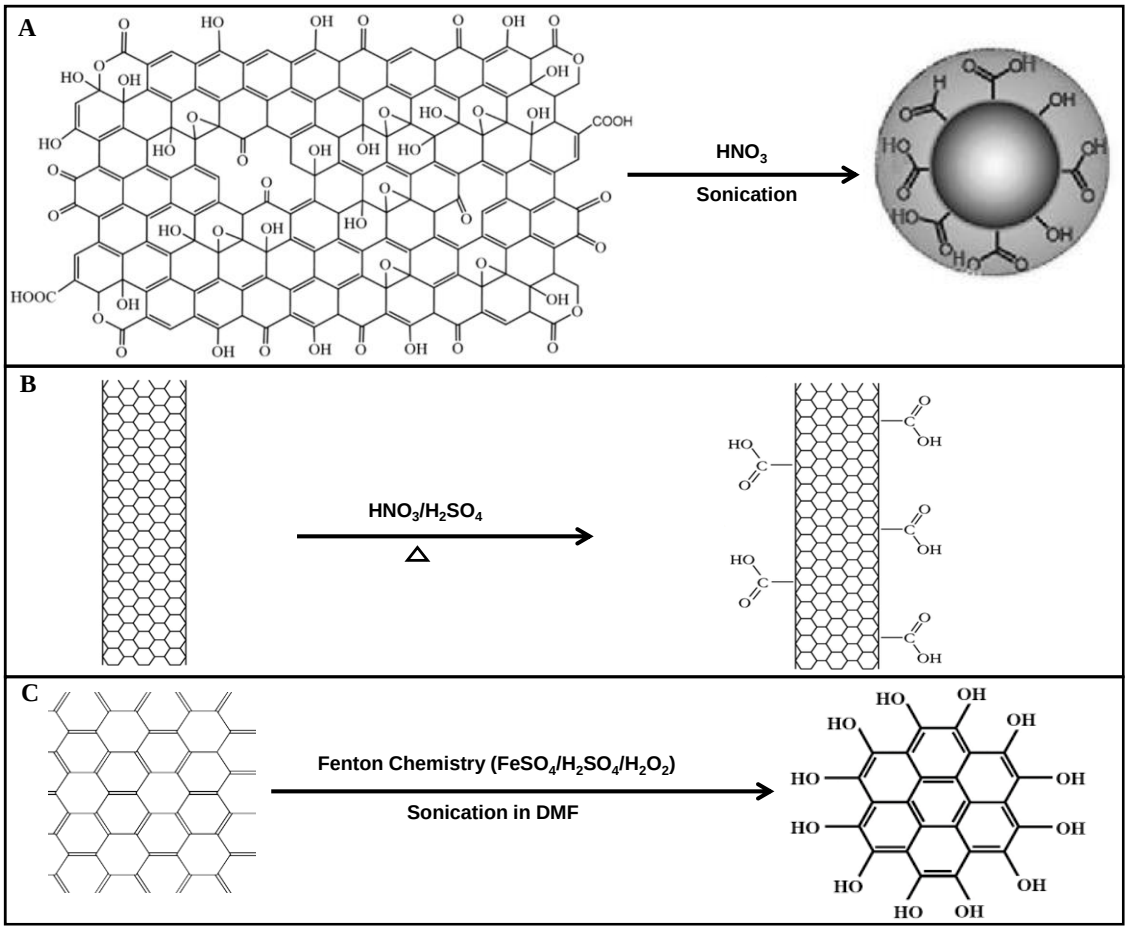

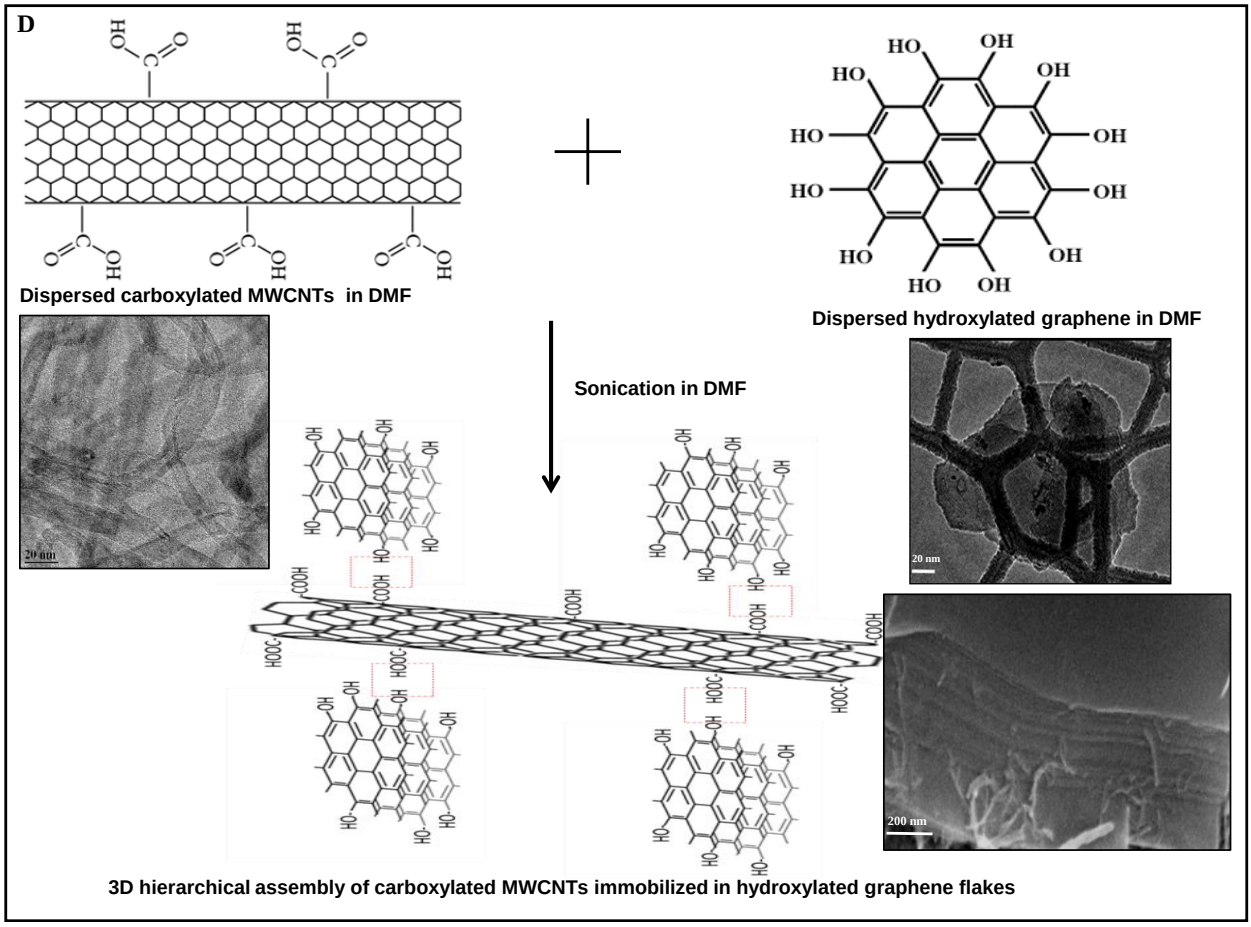

Fig S1: Schematic representation of the preparation methods for (A) 0D, (B) 1D, (C) 2D and (D) hybrid hierarchical functional nanofillers.

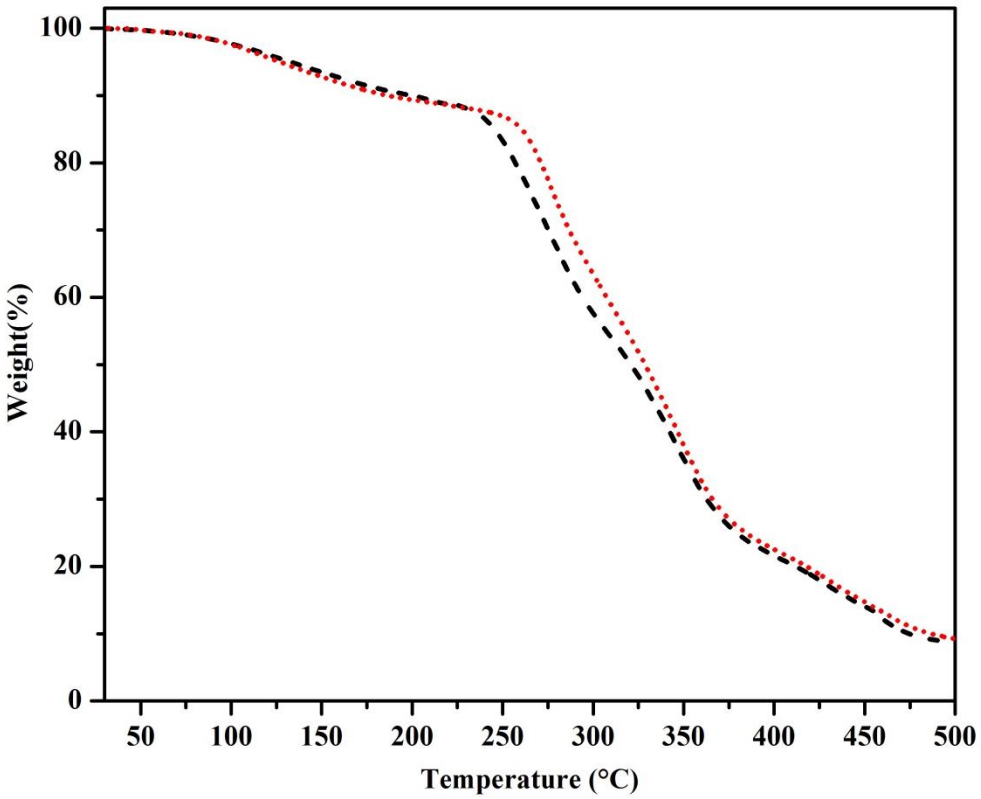

Fig S2: Thermogravimetric (TGA) analysis result of PVA hydrogel (black dashed line) and PVA-melamine (red dotted line) hybrid crosslinked hydrogel.

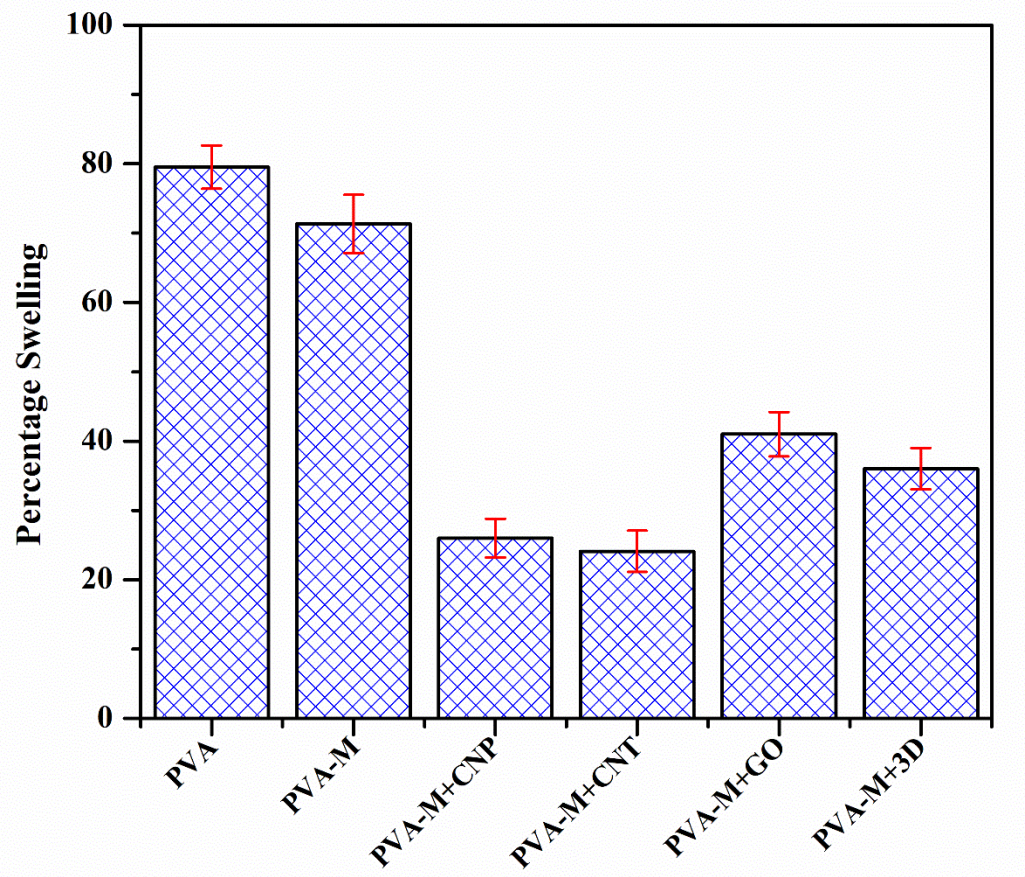

Fig S3: The extent of swelling of PVA, PVA-melamine (PVA-M) hybrid network hydrogel, PVA-melamine nanocomposite gels with 0.5 weight percentages of carbon nanotubes (PVA-M+CNT), carbon nanoparticles (PVA-M+CNPs), graphene (PVA-M+GO) and CNTs embedded into graphene flakes (PVA-M+3D) are represented graphically.

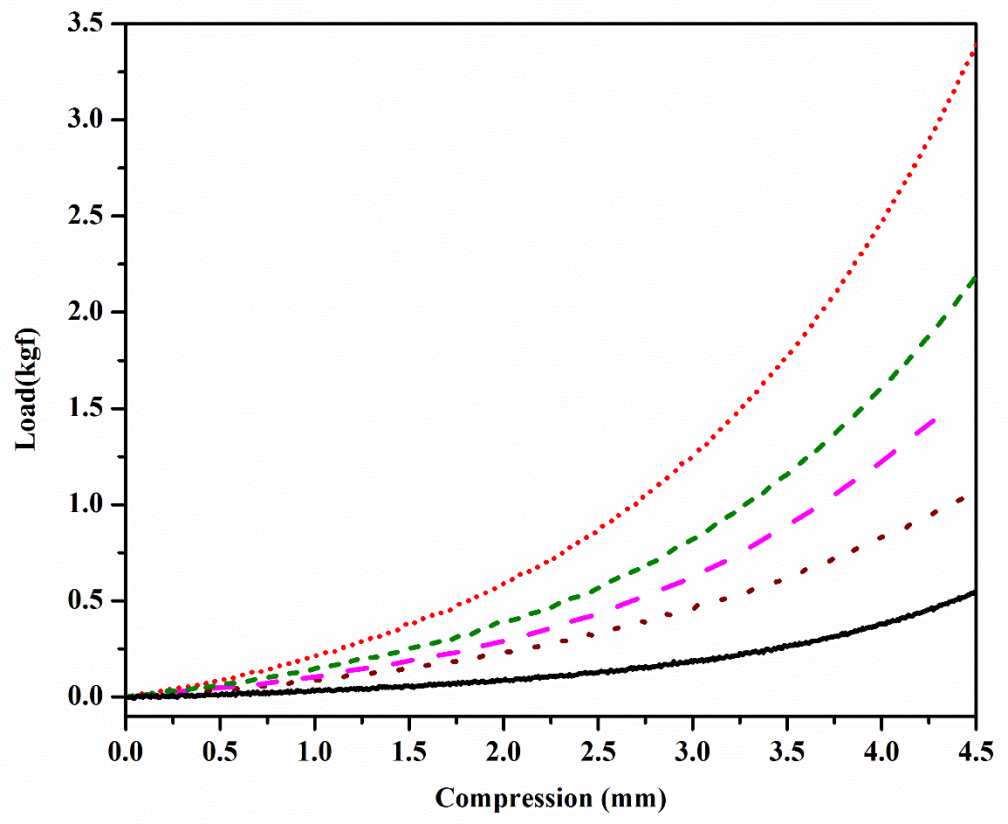

Fig S4: The comparative flexural strength of PVA hydrogel (black thick line) and 0.5 weight percentages of carbon nanoparticles (brow dotted line), carbon nanotubes (green short dashed line), graphene (magenta dashed line) and CNT immobilized graphene flakes (red short dotted line) were represented.

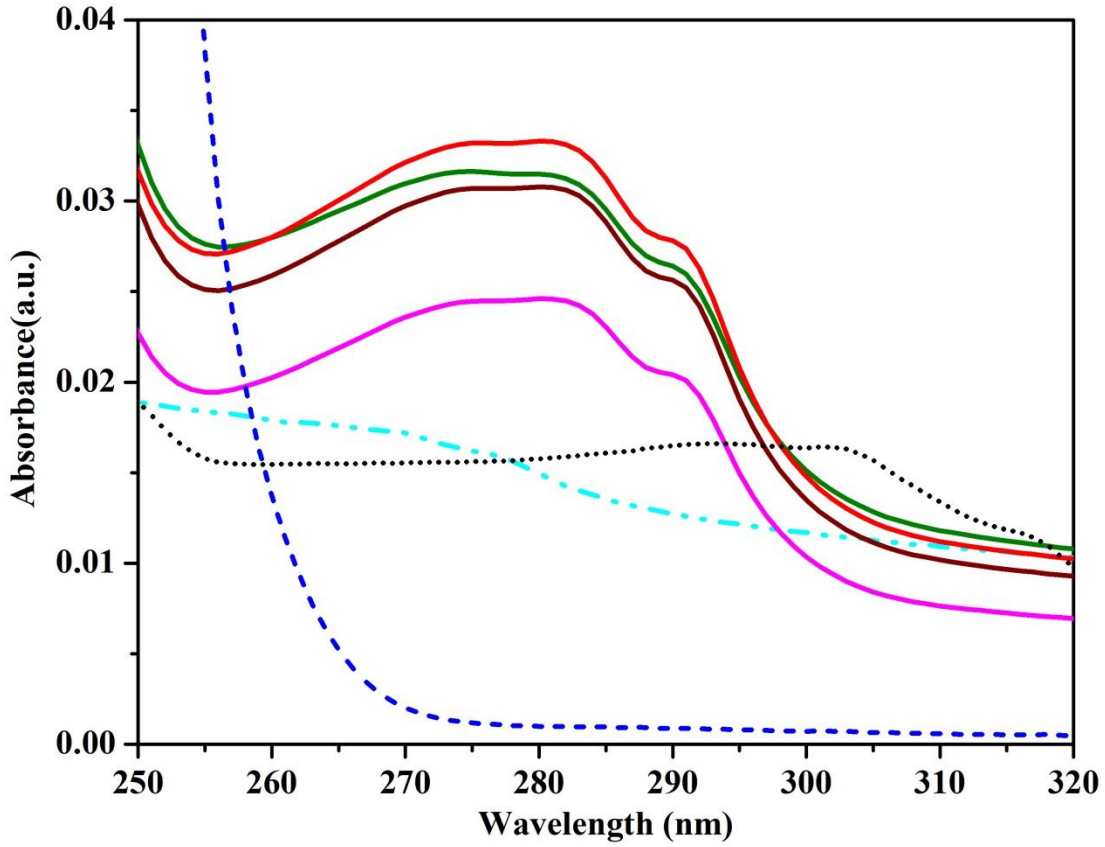

Fig S5: The UV absorption spectra of PBS enzyme solution (black dotted line), PVA solution (sky blue dashed dot line) and melamine solution (deep blue dashed line) are illustrated in the figure. The UV absorption of enzymatically degraded solution of the nanocomposite hydrogels of 0.5 weight percentages of carbon nanoparticles (brown), carbon nanotubes (green), graphene (magenta) and CNT immobilized graphene flakes (red) after 06 days were represented.

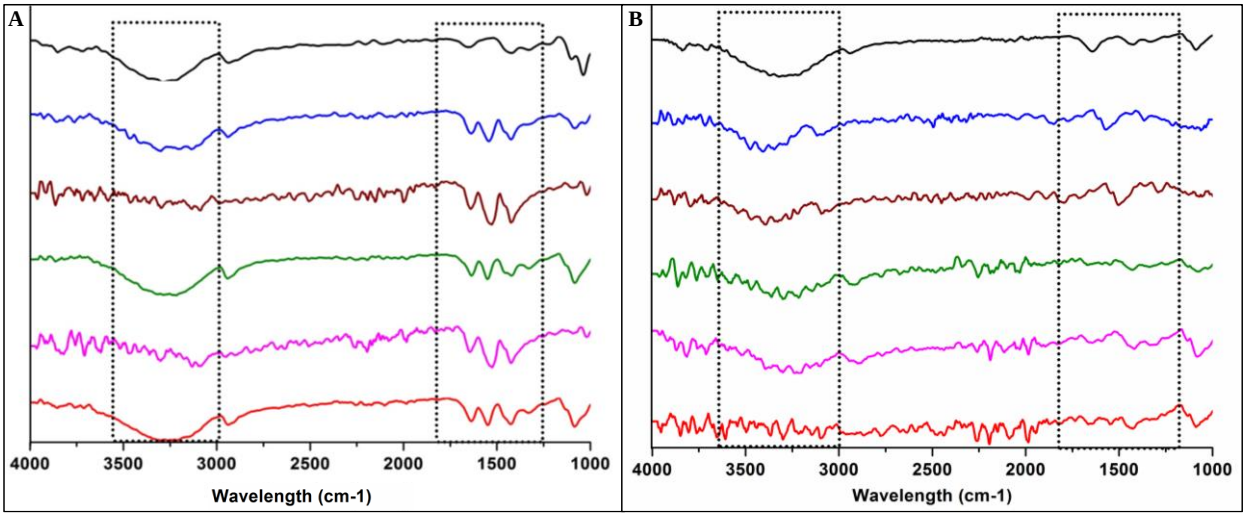

Fig S6: The comparative FTIR spectra of hydrogel samples before (A) and after (B) 06 days of enzymatic degradation process where PVA (black), PVA-melamine crosslinked hybrid hydrogel (blue), 0.5 weight percentages of carbon nanoparticles (brown), carbon nanotubes (green), graphene (magenta) and CNT immobilized graphene flakes (red) reinforced PVA-melamine hydrogel were represented respectively.

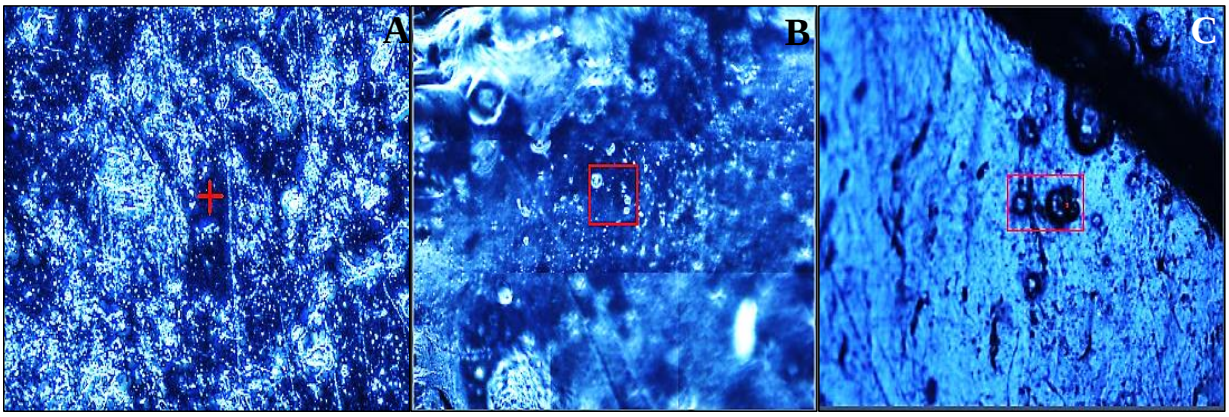

Fig S7: The optical microscopic images using 5X objective of nanocomposite hydrogel samples have been displayed where the loading of functionalized multiwalled carbon nanotubes were varied as (A) 0.25, (B) 0.5 and (C) 1.0 weight percentages.