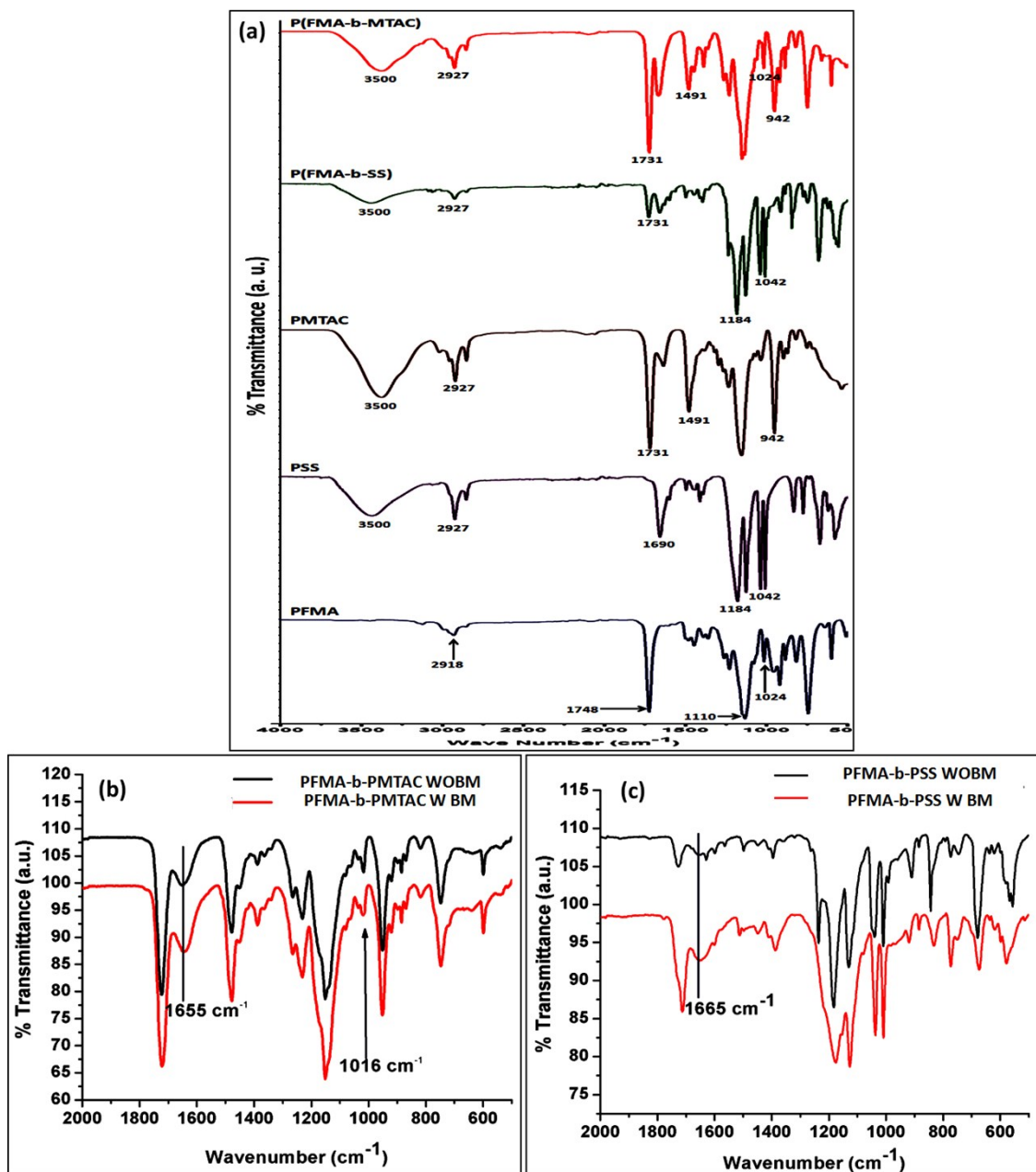


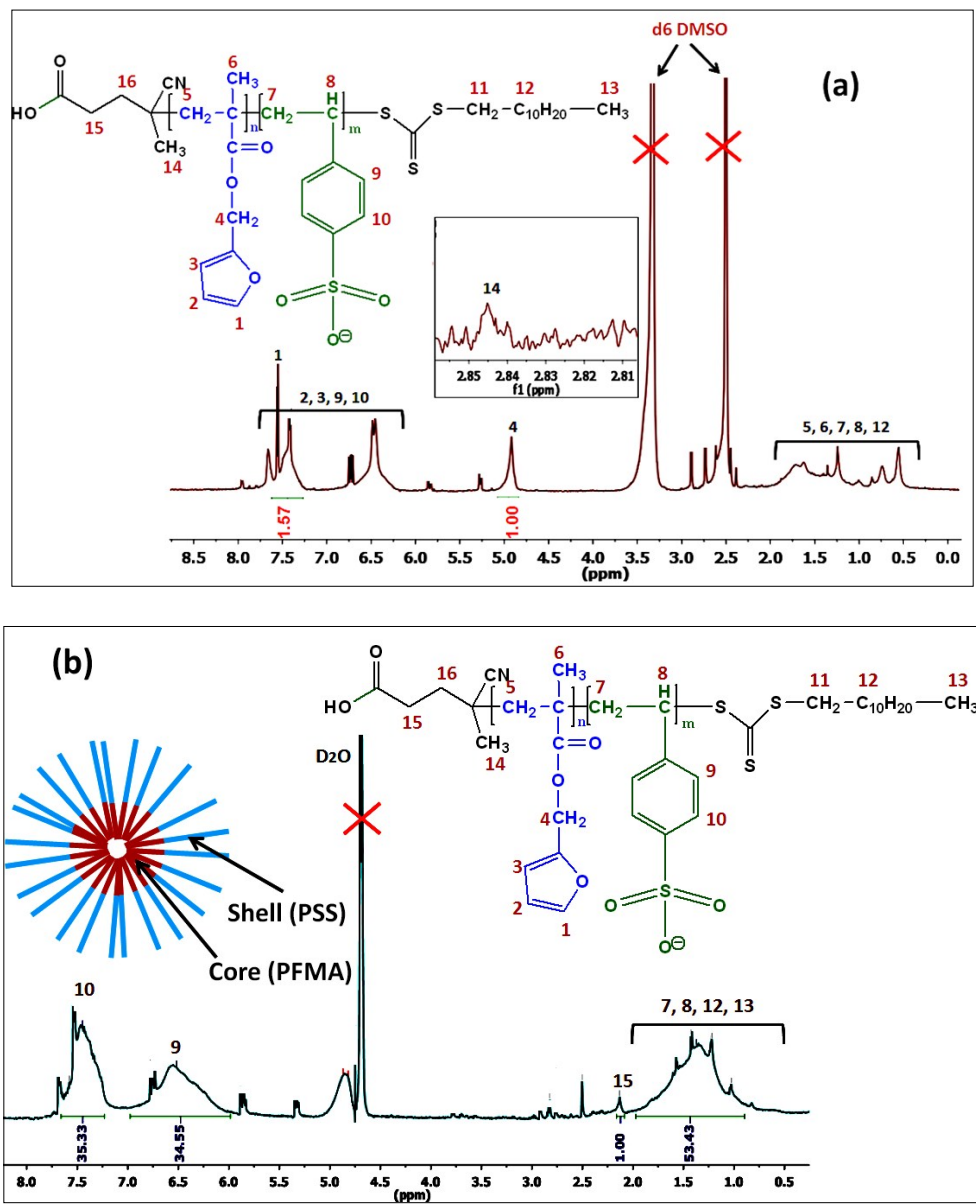
## A New Class of Dual Responsive Self-healable Hydrogels Based on Core Crosslinked Ionic Block Co-polymers micelle Prepared via RAFT Polymerization and Diels-Alder “click” chemistry

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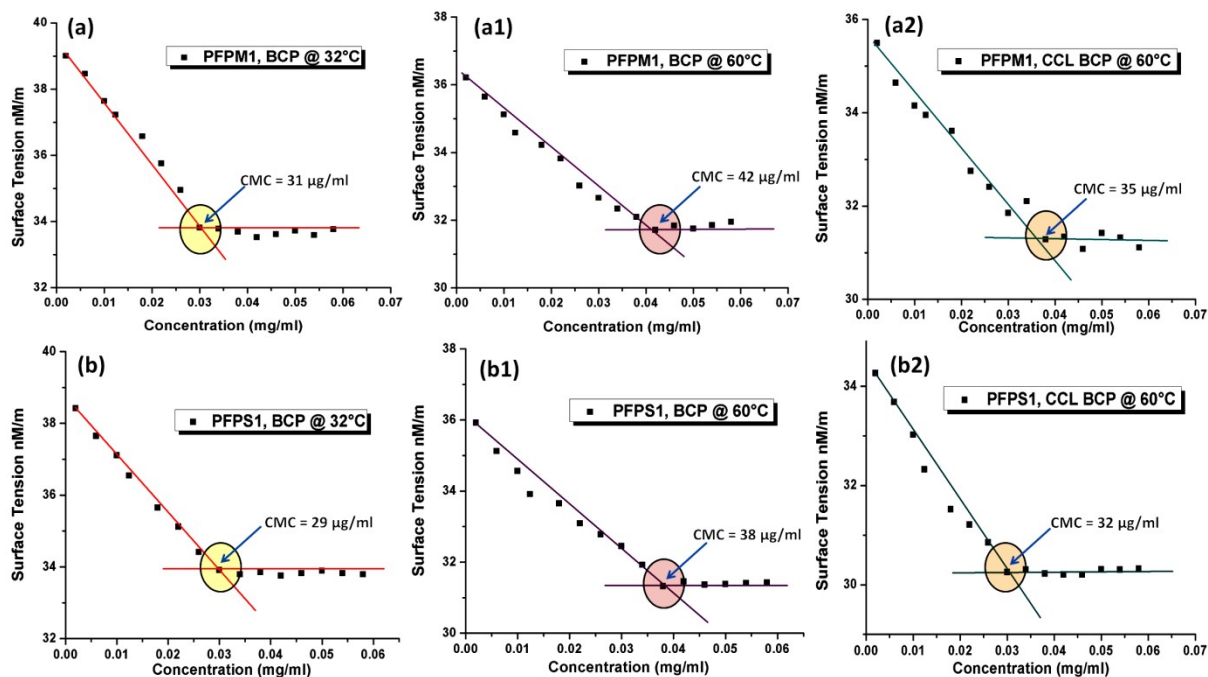
Rubber Technology Centre, Indian Institute of Technology, Kharagpur, India.



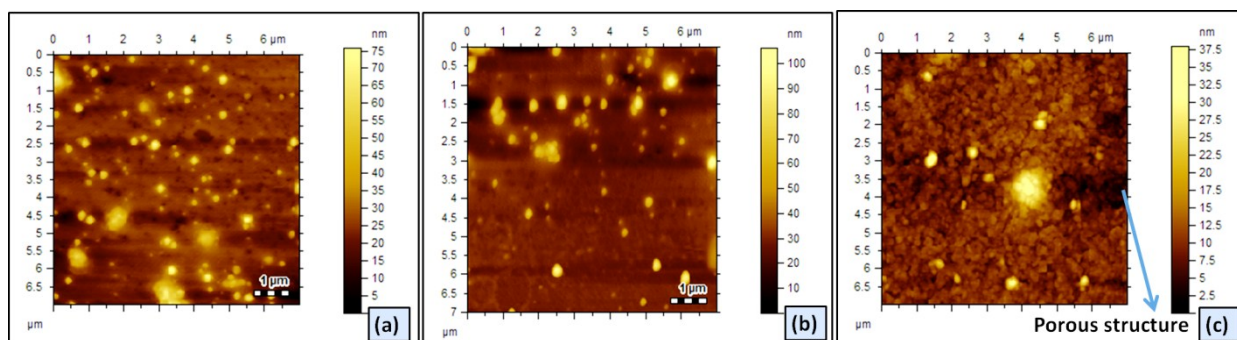
**Figure. S1:** FTIR analysis of (a) homopolymers and the block copolymers, (b) PFMA-*b*-PMTAC with and without core crosslinking and (c) PFMA-*b*-PSS with and without core crosslinking.



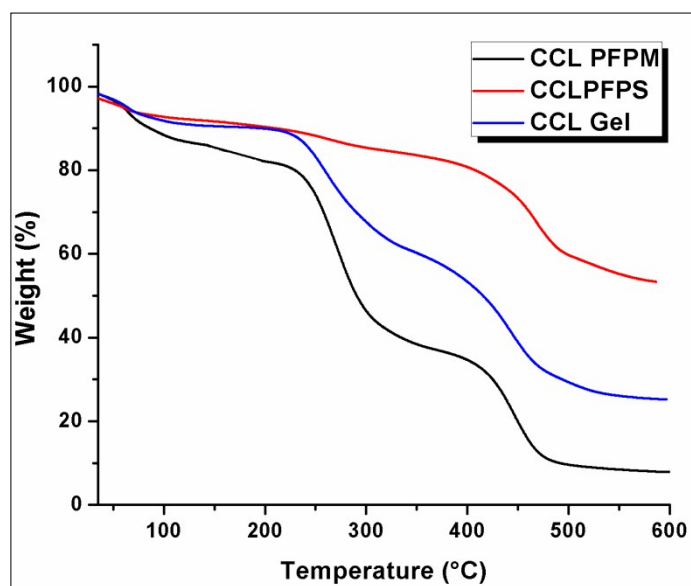
**Figure. S2:**  $^1\text{H}$  NMR spectra of (a) PFMA-*b*-PSS in  $\text{d}_6$  DMSO, (b) PFMA-*b*-PSS in  $\text{D}_2\text{O}$ .



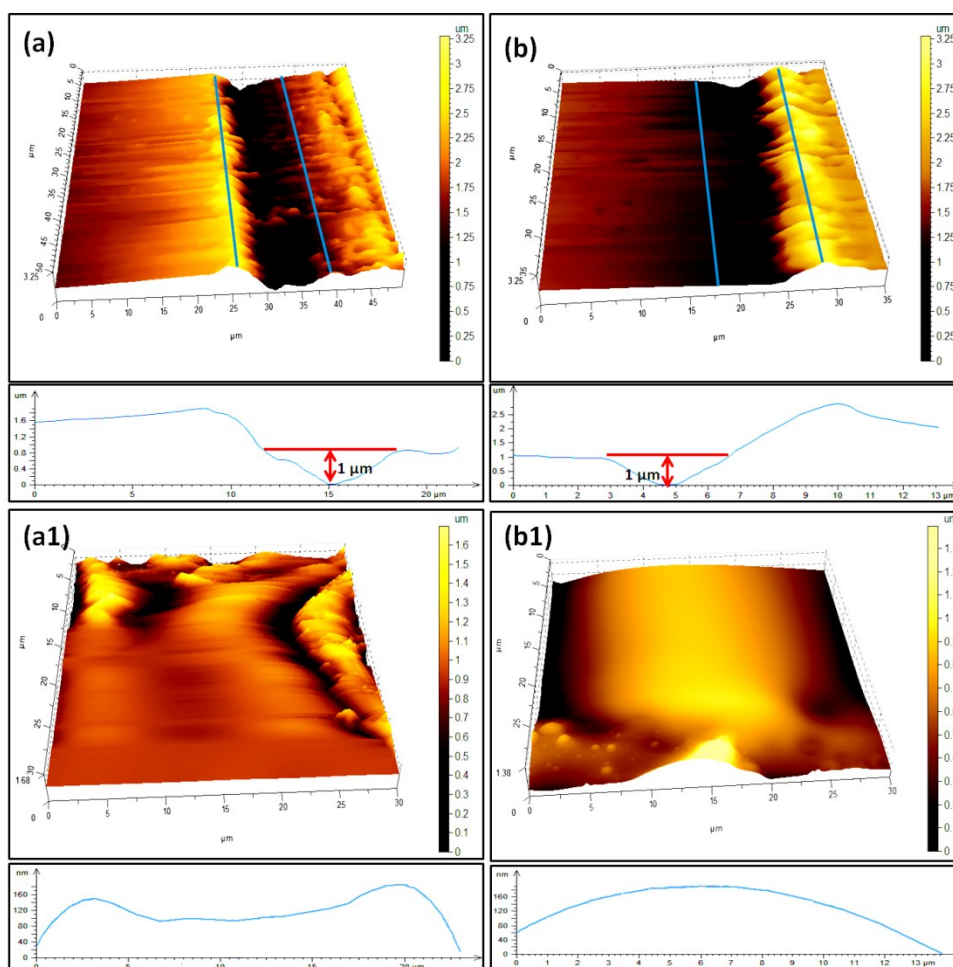
**Figure S3:** CMC values of the cationic (a, a1 and a2) and anionic (b, b1, b2) block copolymers.



**Figure S4:** AFM of the (a) Core cross-linked PFMA-*b*-PMTAC micelle, (b) core cross-linked PFMA-*b*-PSS micelle and (c) the formed porous hydrogel via ionic interaction of polyelectrolyte BCPs.



**Figure S5:** Thermogravimetric analysis of respective components.



**Figure S6:** AFM 3D surface profilometry analysis of the self-healing in CCL BCP gel upon application of heat (**a and a1**) and water (**b and b1**).