

Supporting Information

Dual Responsive Ionic Liquid-Based Polymeric Hydrogel: A Promising Drug Delivery Vehicle for the Treatment of Breast Cancer

Raviraj Pansuriya^a, Tapas Patel^a, Sanjay Mehra^{b,c}, Arvind Kumar^{b,c}, Omar A. El Seoud^d,
Sugam Kumar^e, Vinod K Aswal^e, Suresh Kumar Kailasa^a, Naved I. Malek^{a,d*}

^aIonic Liquids Research laboratory, Department of Chemistry, Sardar Vallabhbhai National Institute of Technology, Surat- 395007, Gujarat, India.

^bAcademy of Scientific and Innovative Research (AcSIR), Ghaziabad-201002, Uttar Pradesh, India.

^cSalt and Marine Chemicals Division, CSIR-Central Salt and Marine Chemicals Research Institute, Council of Scientific and Industrial Research, G. B. Marg, Bhavnagar, 364002, Gujarat, India

^dInstitute of Chemistry, University of São Paulo, 05508-000 São Paulo, SP, Brazil

^eSolid State Physics Division, Bhabha Atomic Research Centre, Trombay, Mumbai-400085, India

Corresponding Author e-mail: navedmalek@chem.svnit.ac.in

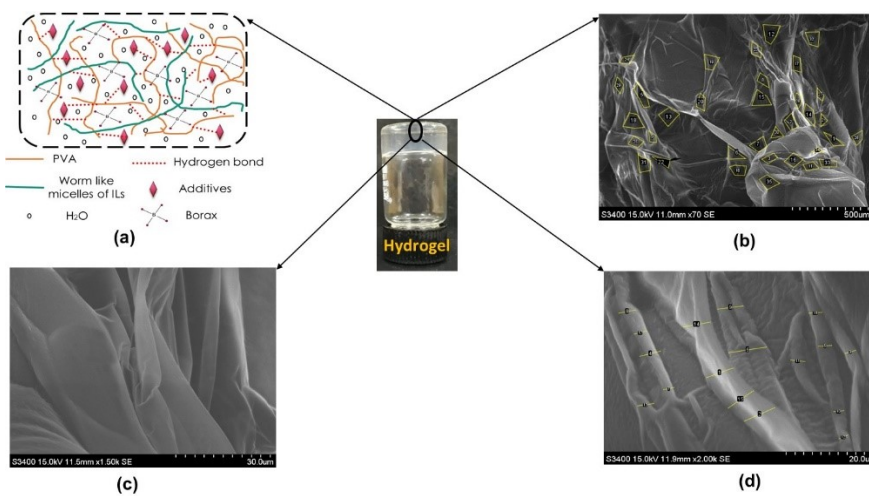
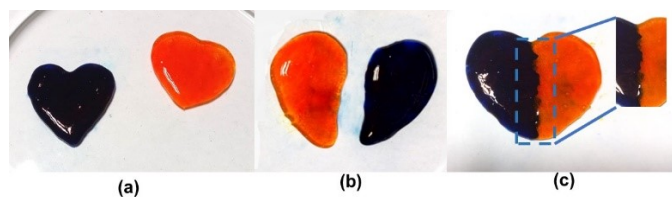


Figure S1: Morphology of hydrogel through SEM images where (a) Schematic representation of the fiber and pores like structure; (b and c) pores within the fibrous matrix; (d) fibers network within the hydrogel.



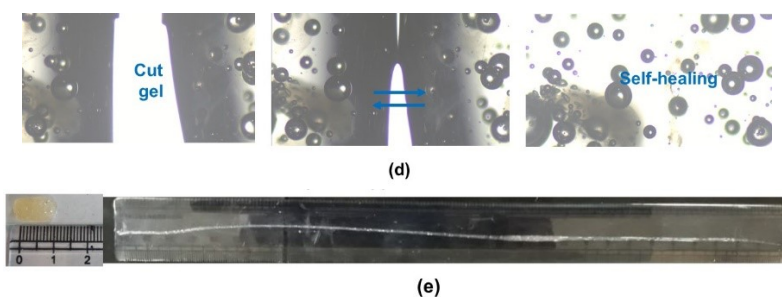


Figure S2: Self-healing property of hydrogel (a) dye contain hydrogel; (b) cut hydrogel with different dye; (c) self-healing of hydrogel; (d) inverted microscopic image of self-healing of hydrogel; (e) Stretchability of the hydrogel.

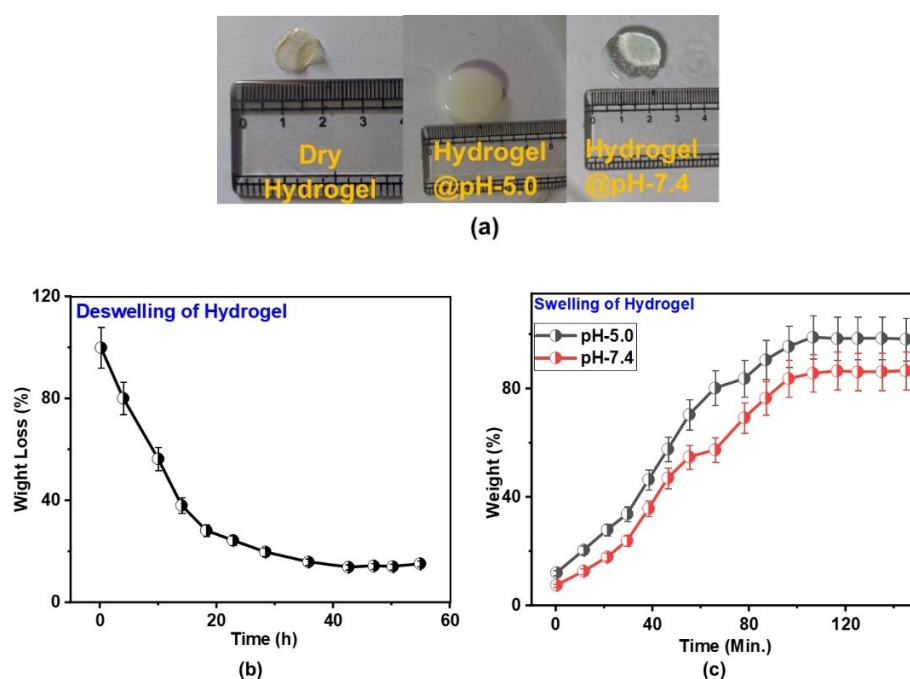


Figure S3: (a) Photos of Dry hydrogel, swelling in 5.0 and 7.4 pH buffer solution, respectively; (b) deswelling of hydrogel; (c) Swelling of hydrogel at 5.0 and 7.4 pH.

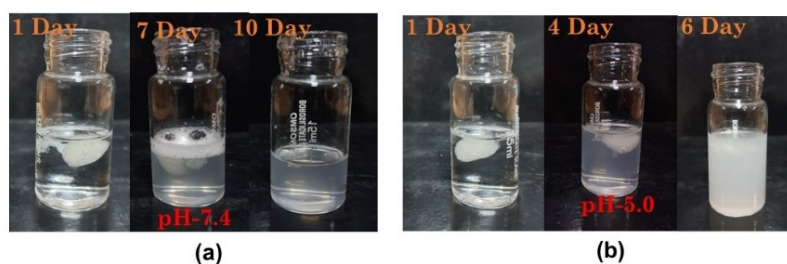


Figure S4: Degradation of hydrogel in PBS with (a) 7.4 pH and (b) 5.0 pH.

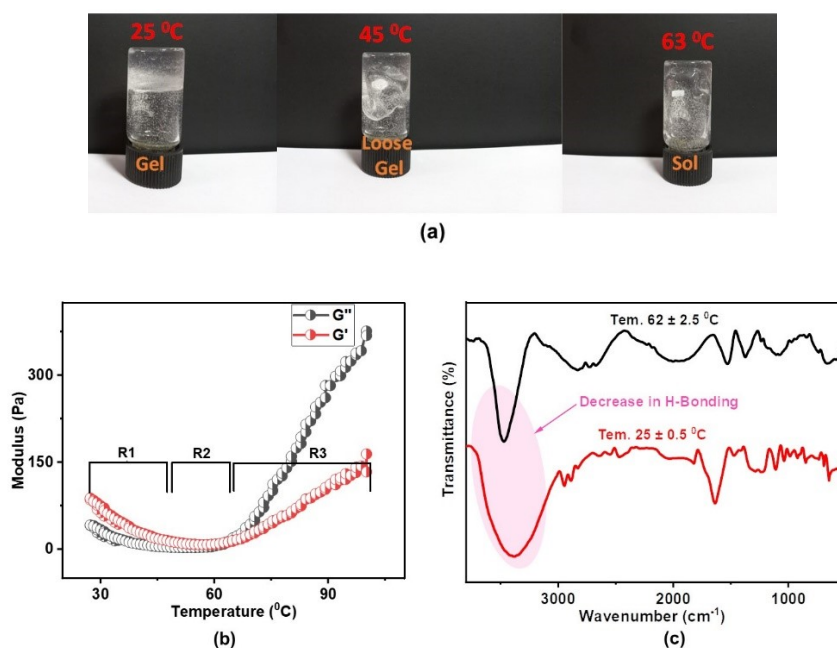


Figure S5: Gel-sol Transition (a) Image of gel-sol transition in tube inversion method (b) Shown Modulus Vs Temperature graph of hydrogel; (c) Shown FTIR spectra of Hydrogel at 25 ± 2.5 °C (**Red line**) and 62 ± 3.5 °C (**Black line**).

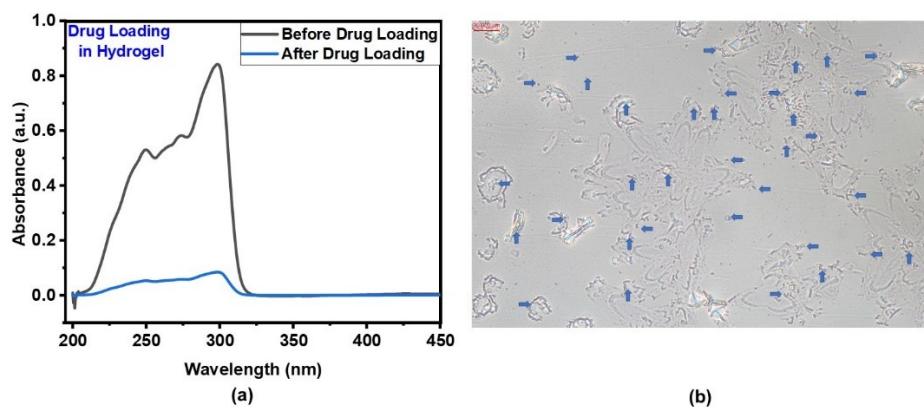


Figure S6: (a) Absorbance measurement of hydrogel before and after loading of 5-FU; (b) Inverted microscopic images of 5-FU loaded hydrogel.

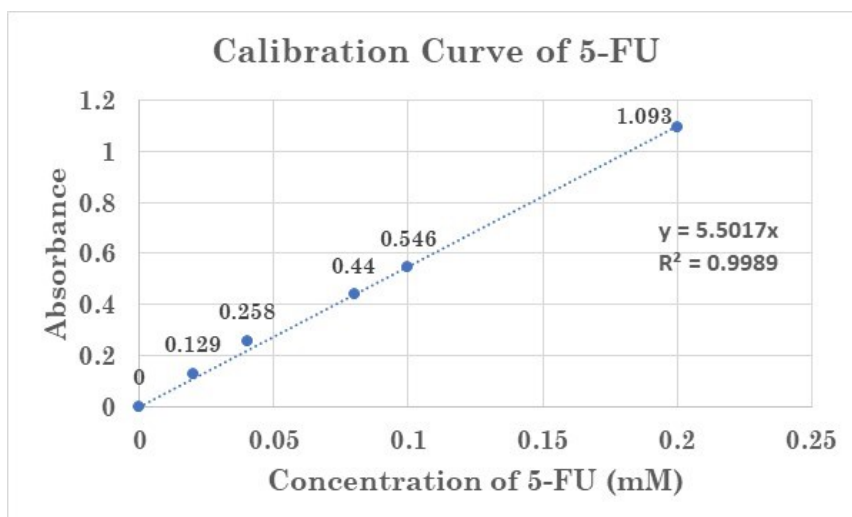


Figure S7: Calibration curve of 5-FU.

Table S1: In vitro drug release data that are fitted into different kinetic models.

| Order | r ² @ pH-5 | | r ² @ pH-7.4 | |
|-----------------------|-----------------------|--------|-------------------------|--------|
| | 25 °C | 37 °C | 25 °C | 37 °C |
| <i>Zero order</i> | 0.9422 | 0.9088 | 0.9577 | 0.9824 |
| <i>First Order</i> | 0.8658 | 0.7232 | 0.9516 | 0.8879 |
| <i>Higuchi</i> | 0.9770 | 0.9563 | 0.9636 | 0.9959 |
| <i>Hixson Crowell</i> | 0.8951 | 0.8605 | 0.9611 | 0.9290 |