Electronic Supplementary Information (ESI)

Anisotropic tough poly (2-hydroxyethyl methacrylate) hydrogels fabricated by directional freezing redox polymerization

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Figure S1. The photograph of a PHEMA hydrogel in the swollen state.

The anisotropic microstructure of the gels might suggest that the gels possess anisotropic optical property. However, it is difficult to investigate the anisotropic optical property of the gels, since the PHEMA hydrogels in the swollen and dried state are optically opaque (Fig. S1) due to the large sizes of the channels or pores (in microns).

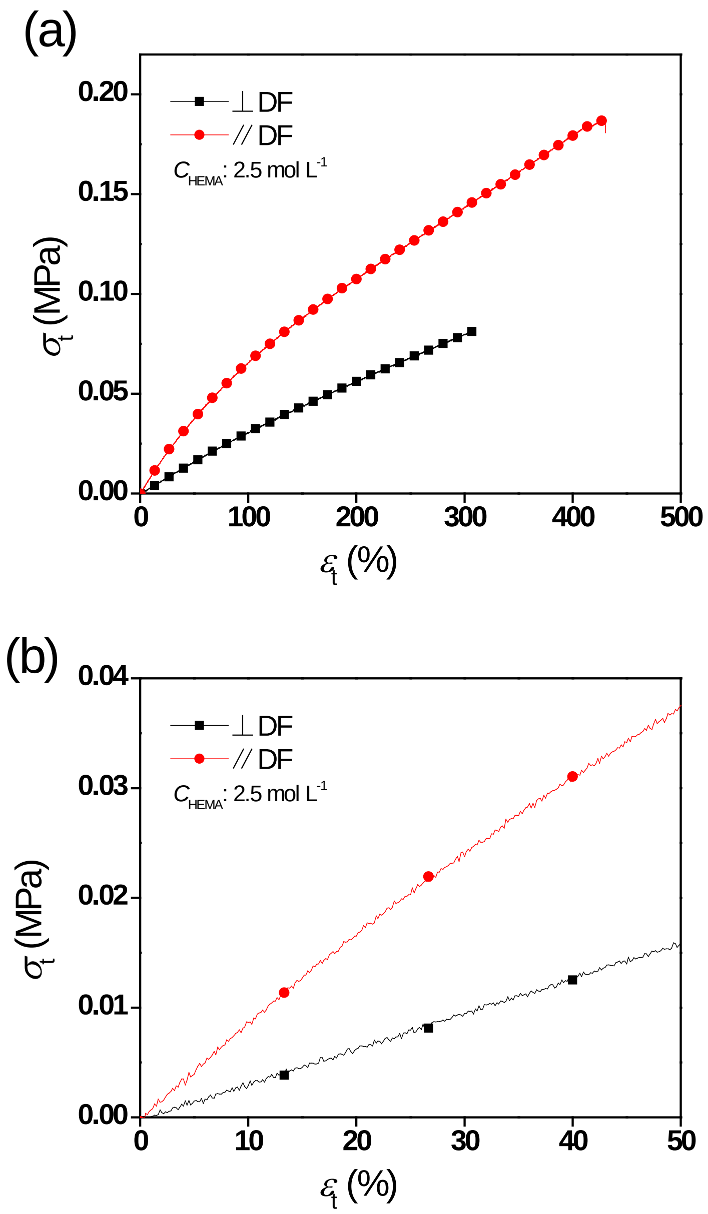

Figure S2. The typical tensile stress-strain curves of the PHEMA hydrogel synthesized with a HEMA concentration of 2.5 mol L^{-1}. (a): Full strain range; and (b): low strain range.

Figure S2 shows the typical tensile stress-strain curves of the PHEMA hydrogel synthesized with a HEMA concentration of 2.5 mol L^{-1}. Fig. S2(a) shows the stress-strain curves in the full strain range, and Fig. S2(b) shows the stress-strain curves in the low strain range. The anisotropic tensile properties of the PHEMA hydrogel can be easily observed from the tensile stress-strain curves. The hydrogel exhibits higher fracture strength (σ_b), elastic modulus (E_t) and fracture strain (ε_b) in the parallel (//DF) direction than those in the perpendicular (⊥DF) direction.

To avoid possible errors induced by the larger deviations in the strain range less than 10%, we calculated the moduli of the gels in the strain range of 10-30%, in which the curves are almost linear.