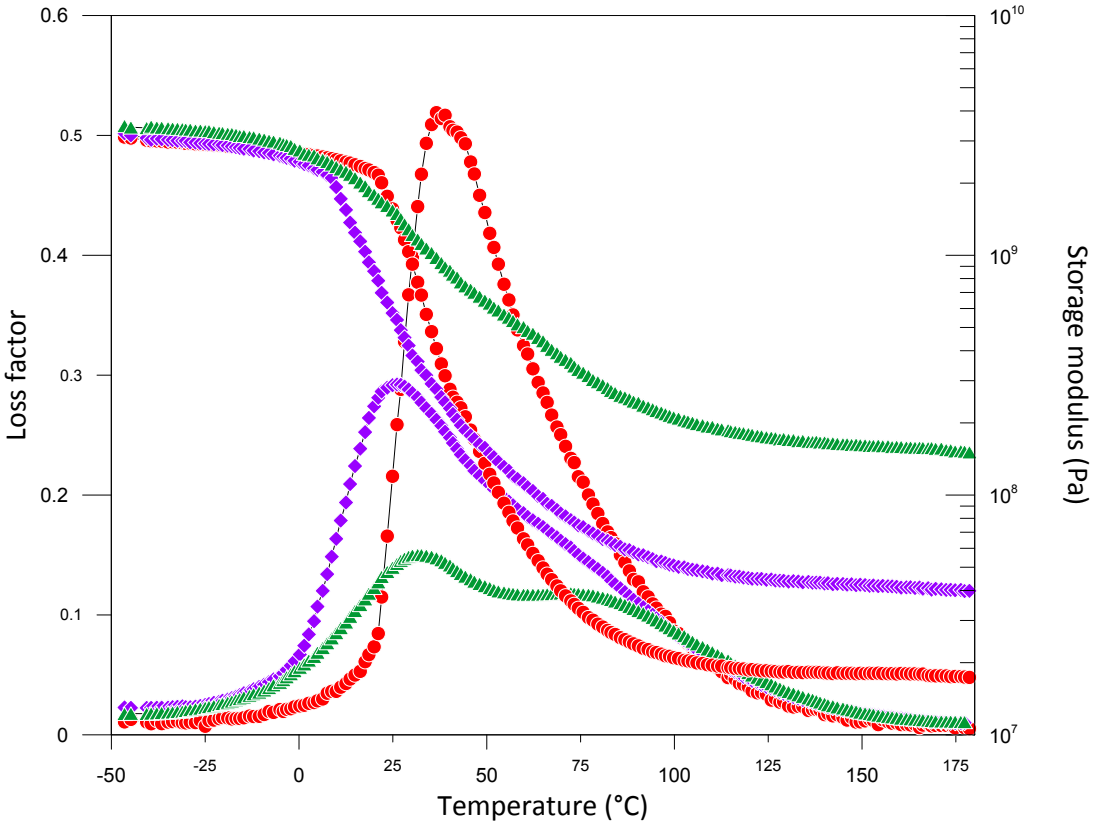
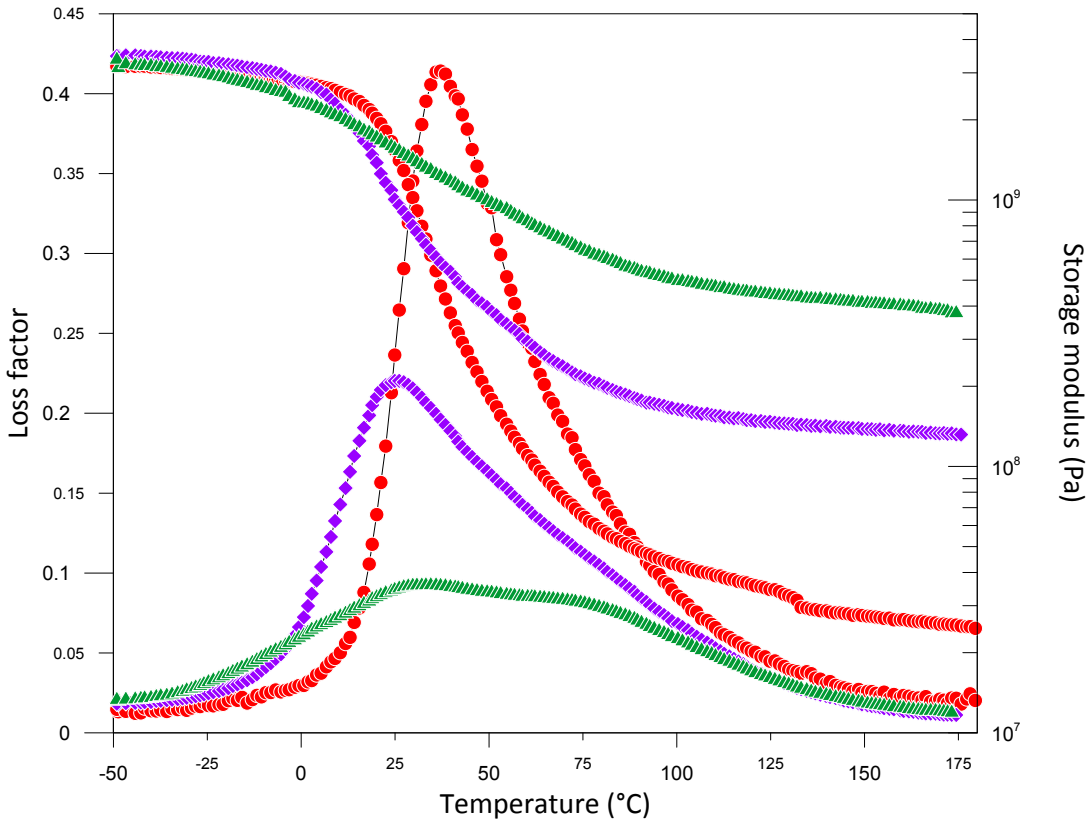
Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information

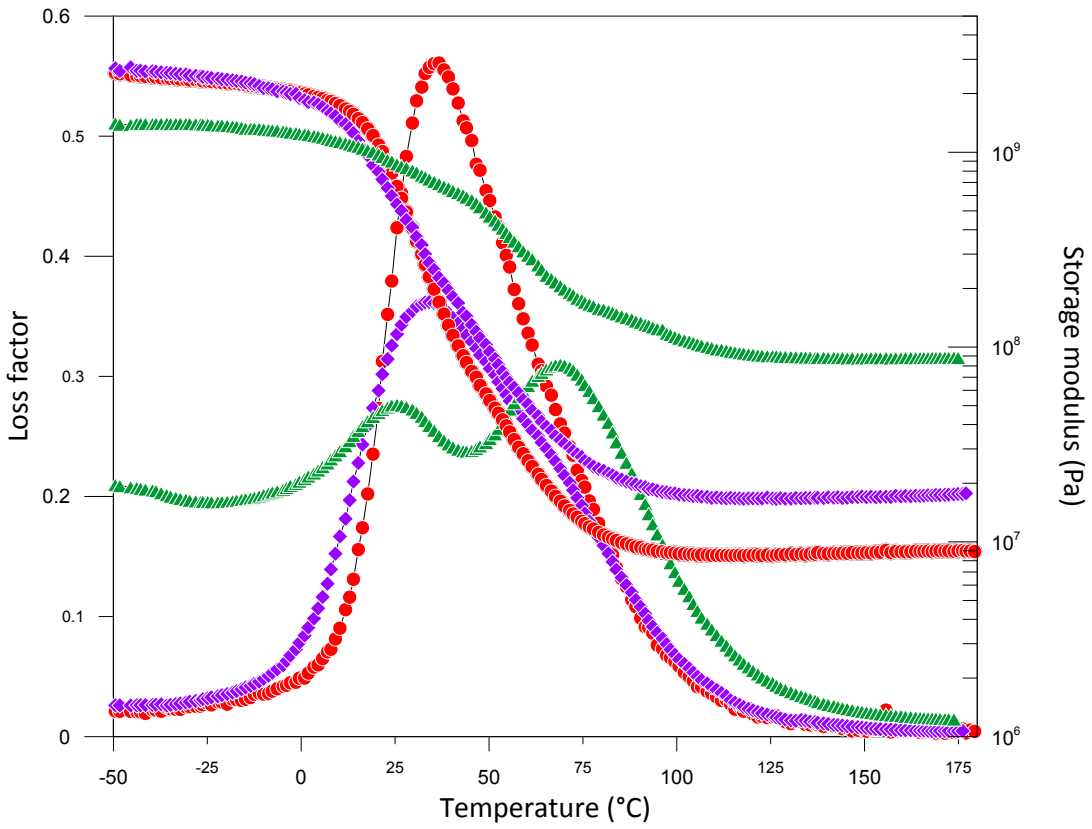
The loss factor vs. temperature curves for the photo-polymeric networks formed by three acrylate-based monomers as a function of monomer content are plotted in Figure S1. By considering the storage modulus in two glassy and rubbery region, the modulus ratio (e) is calculated.



(a)


0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Loss factor
10^9
10^8
10^7
Storage modulus (Pa)
-50
-25
0
25
50
75
100
125
150
175
Temperature (°C)

(b)

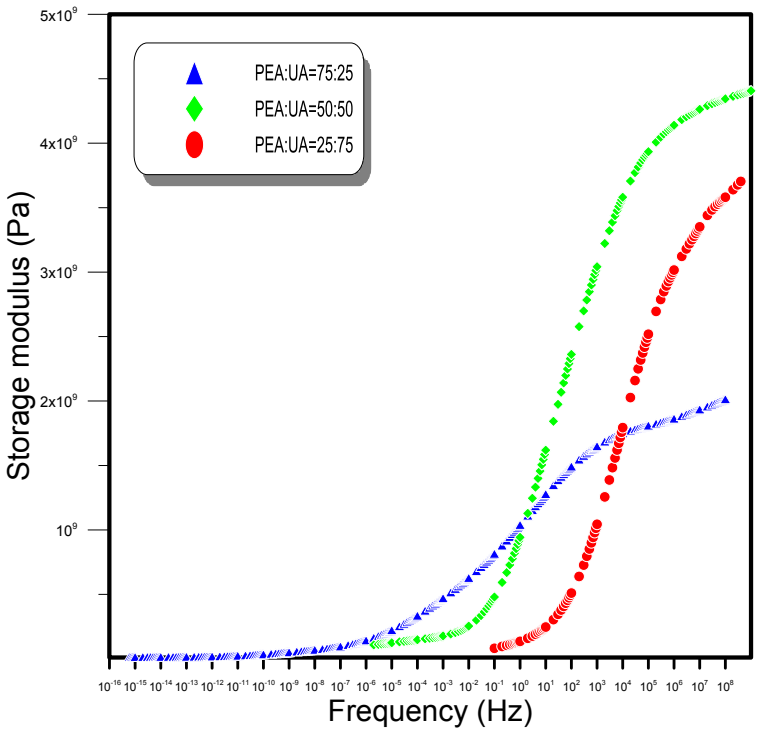


(c)

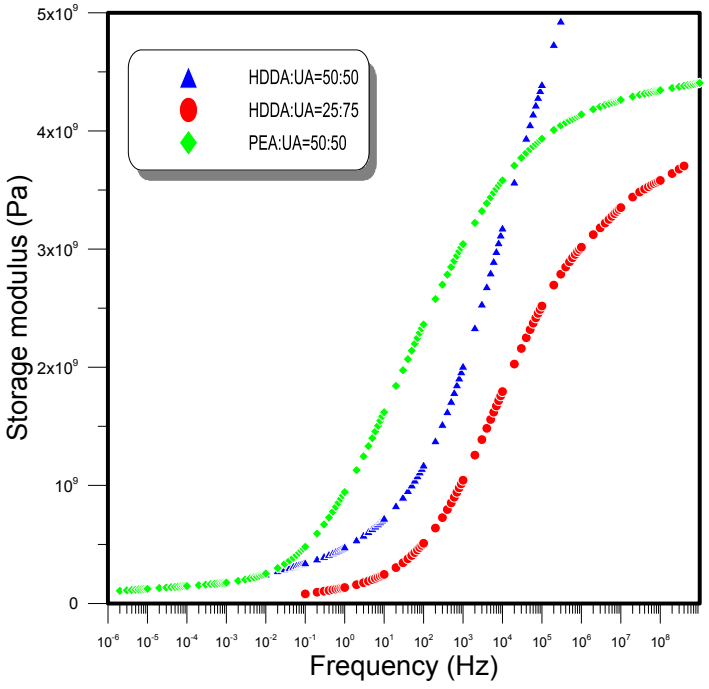
Figure S1. The loss spectra of the photo-polymeric networks formed by different monomers: (a) PEA, (b) HDDA and (c) TMPTA as a function of different monomer content: (Circle) UA-co-M25, (Diamond) UA-co-M50 and (Triangle) UA-co-M75. (d) the loss factor and storage modulus of the pure pre-polymer as a function of temperature.

The tensile strength (σ_b) and the strain at break (ε) values for different samples are extracted from the stress-strain data.

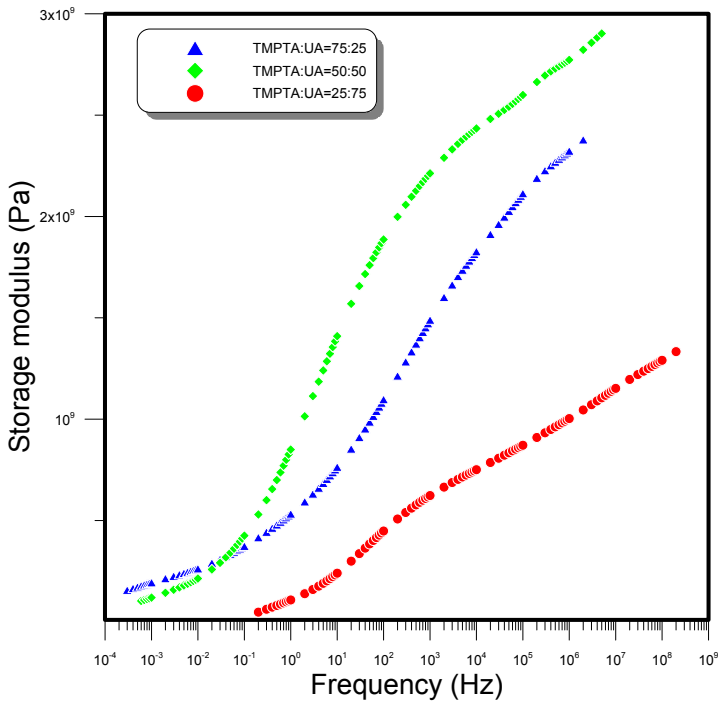
The relaxation time and the dynamic heterogeneity of the networks are determined based on the data obtained from the constructed master curves (Figure S2) by using KWW model.


PEA:UA=75:25
PEA:UA=50:50
PEA:UA=25:75
Storage modulus (Pa)
Frequency (Hz)

(a)


HDDA:UA=50:50
HDDA:UA=25:75
PEA:UA=50:50
Storage modulus (Pa)
Frequency (Hz)

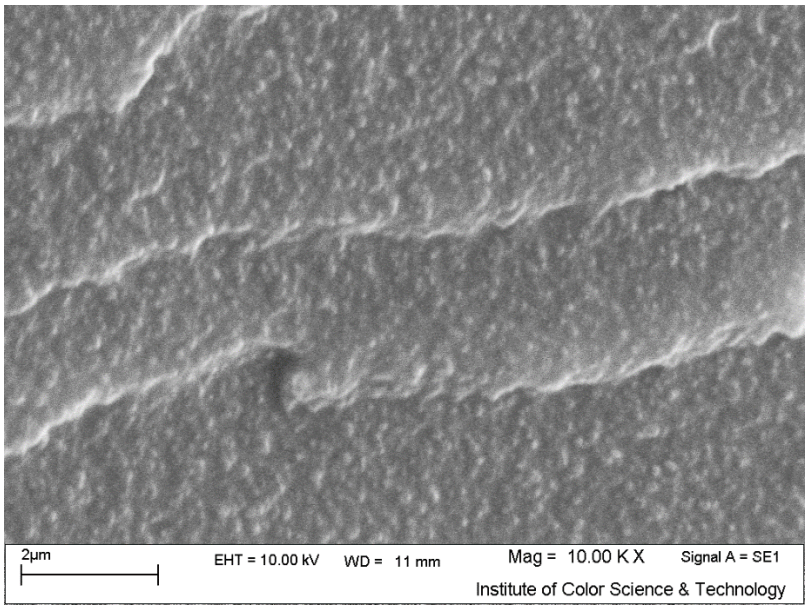
(b)



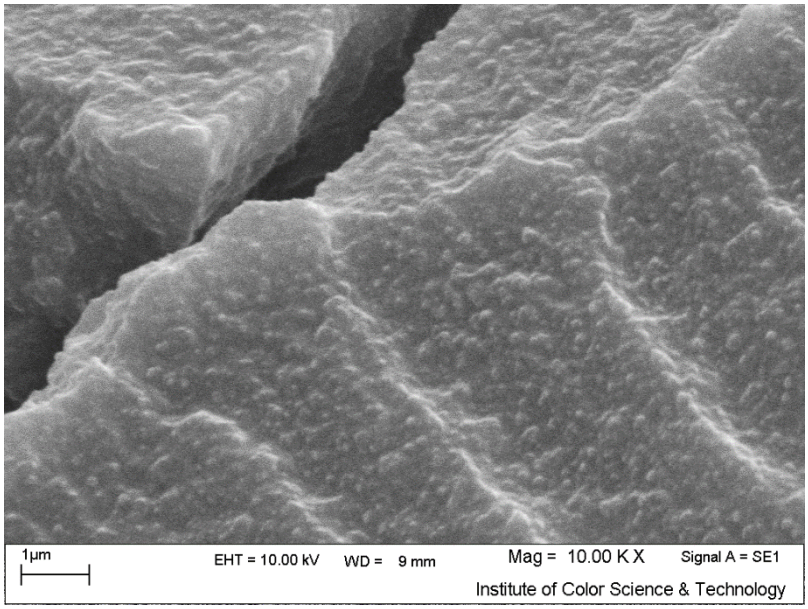
(c)

Figure S2. The master curves constructed by the isothermal results of DMA.

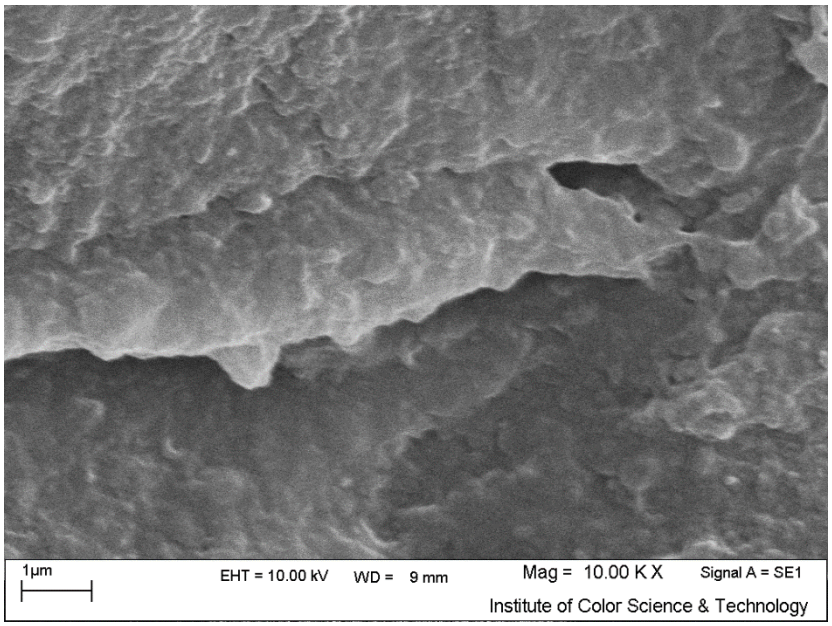
The structural heterogeneity of the samples as a function of the monomer content for different monomers is clear in the scanning electron micrographs (Figure 3s).



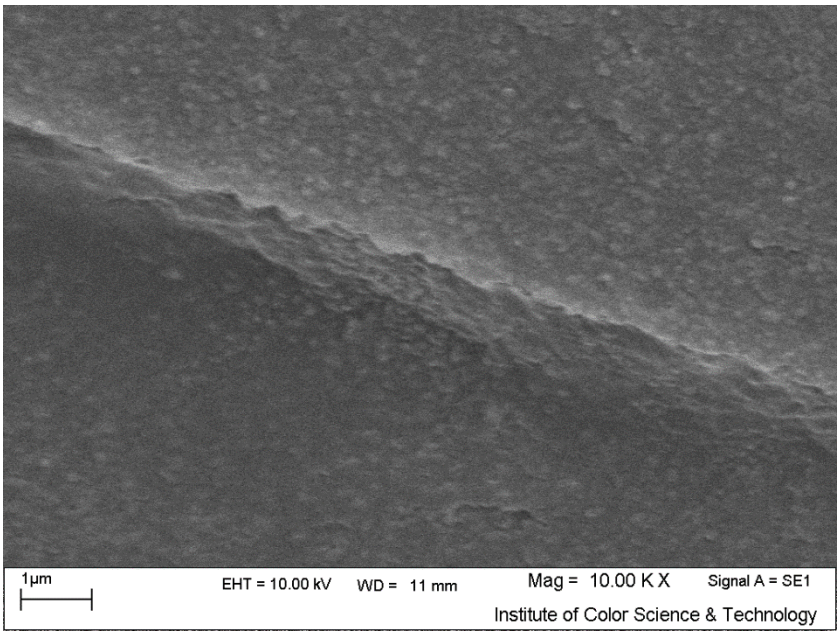
UA-co-PEA25



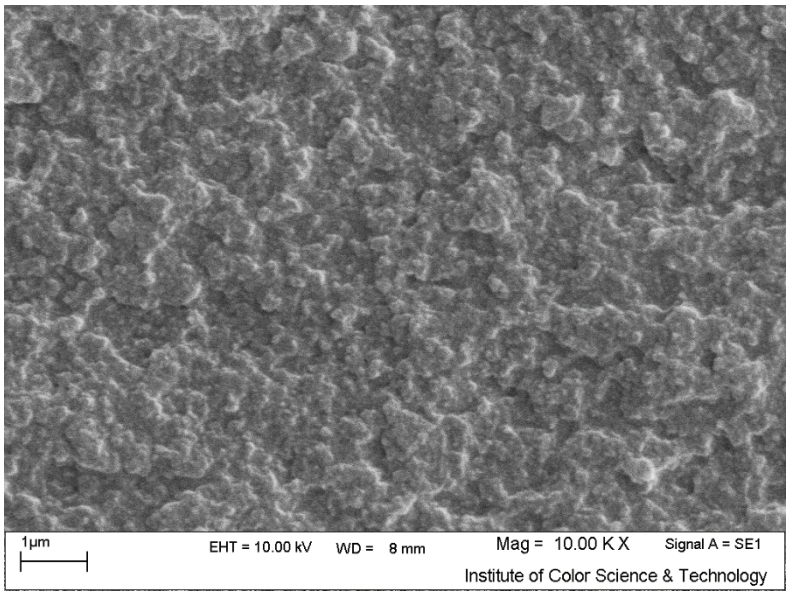
UA-co-PEA50



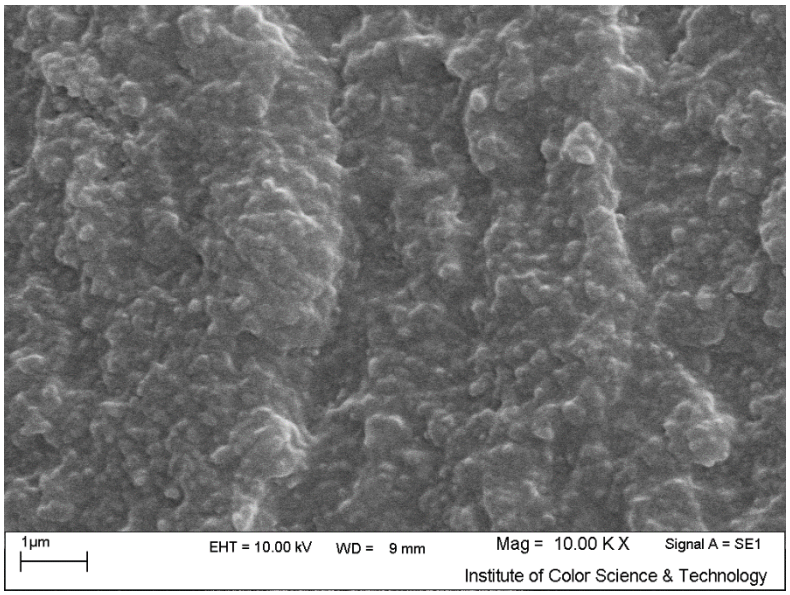
UA-co-PEA75



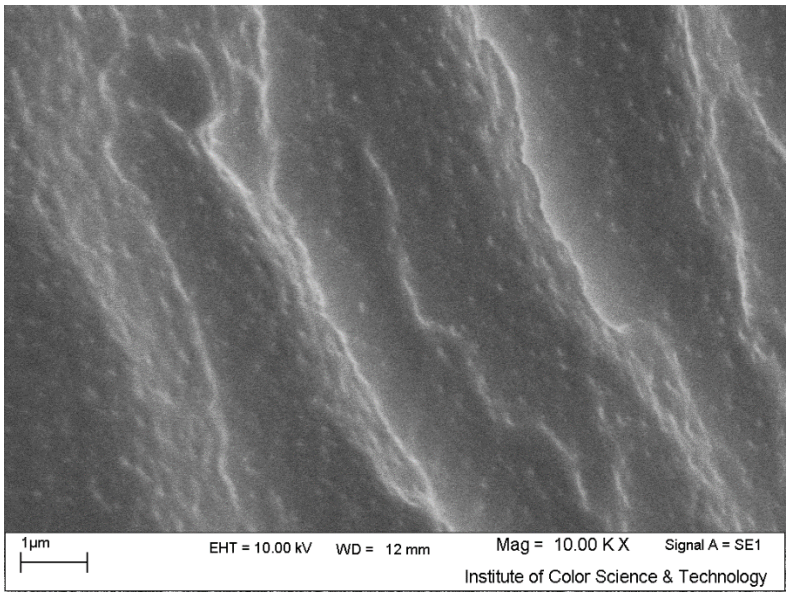
UA-co-HDDA25



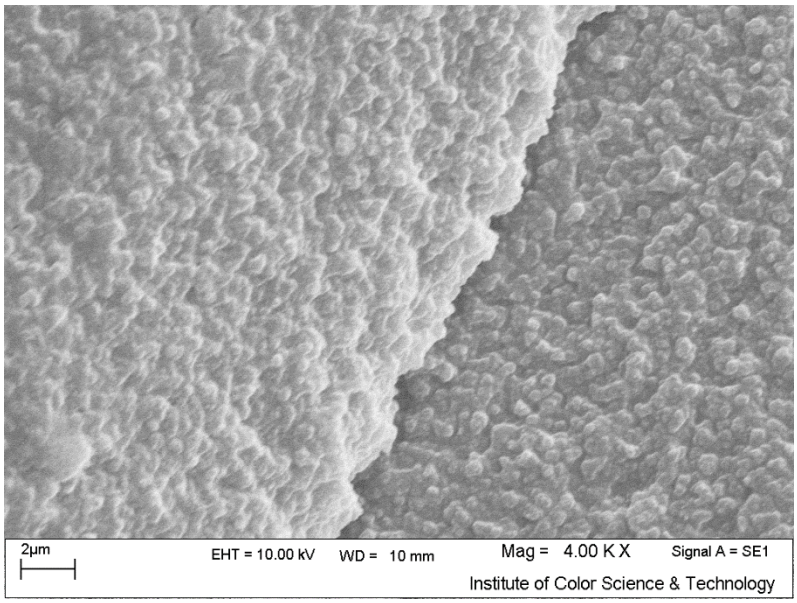
UA-co-HDDA50



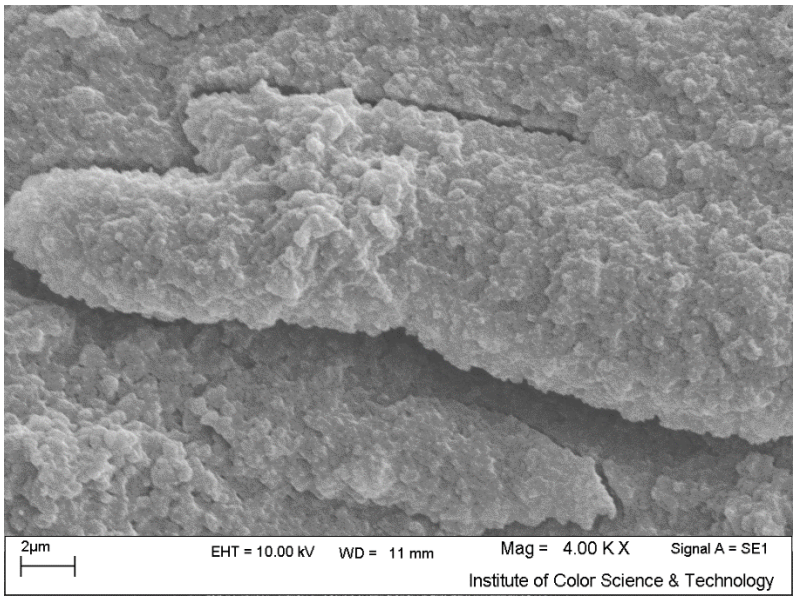
UA-co-HDDA75



UA-co-TMPTA25



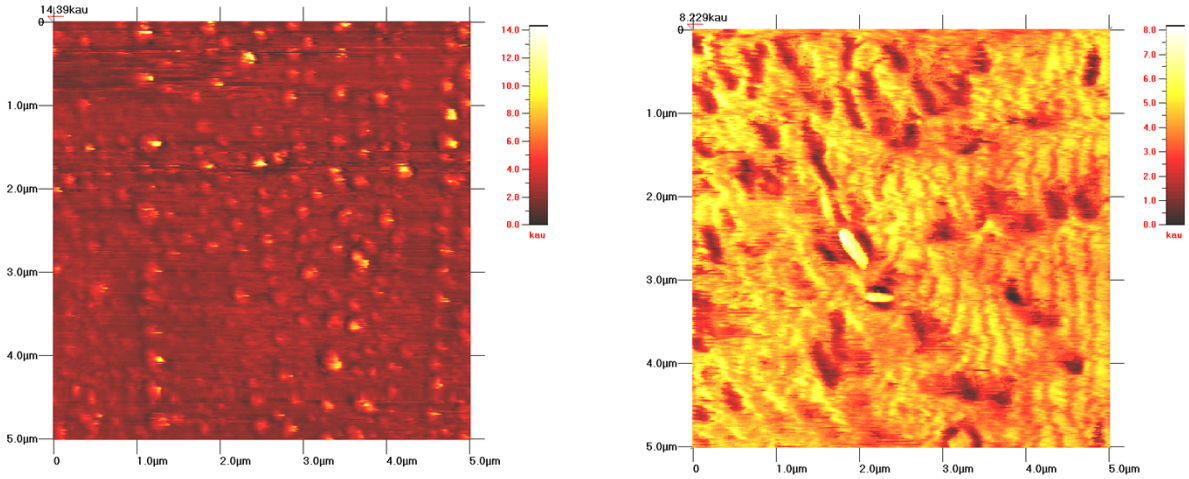
UA-co-TMPTA50



UA-co-TMPTA75

Figure S3. The SEM images for different samples:

The micro-gel domains embedded in the matrix is completely clear throughout the AFM images (Figure S4).



(a) (b)

Figure S4. The AFM images for the PEA-based networks consisting of (a) 25 wt% and (b) 75 wt% as monomer content.

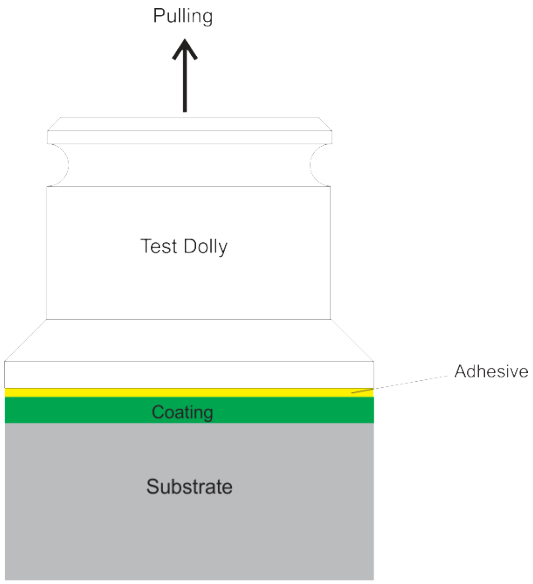


Figure S5. A schematic drawing of the adhesion experimental test.