Supporting Information for

Supramolecular Elastomers. Particulate β-Sheet Nanocrystal-Reinforced Synthetic Elastic Networks

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Contents

1. Additional AFM images

AFM. Both the height and phase images obtained in the tapping mode only revealed features attributed to the microtoming process as shown in Figure S1.

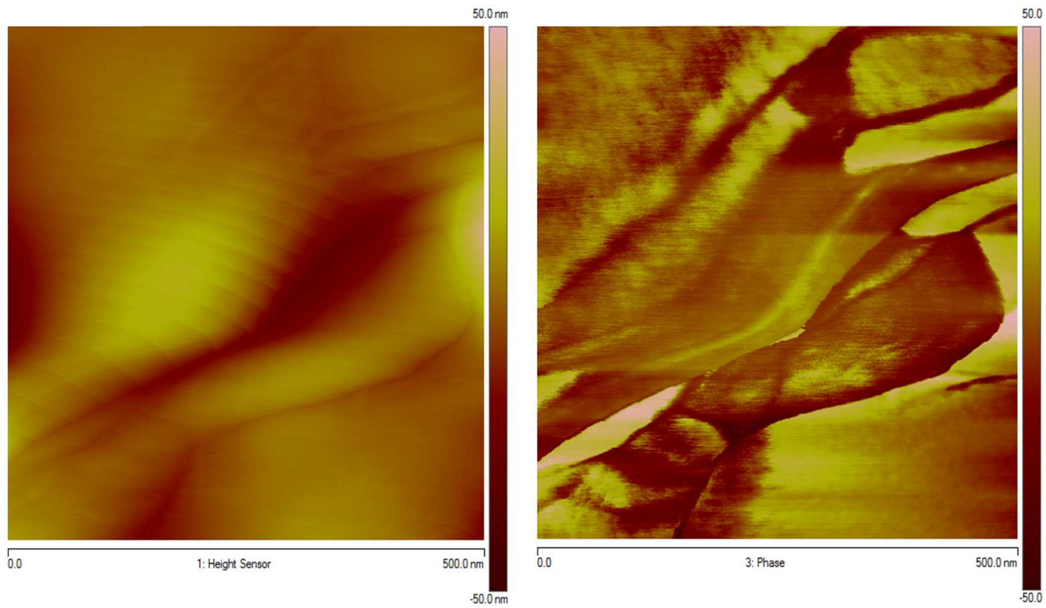


Figure S1. Height (left) and phase (right) images of microtomed films of **4c** obtained from tapping mode AFM. Only shear banding and contours from microtoming are observed.

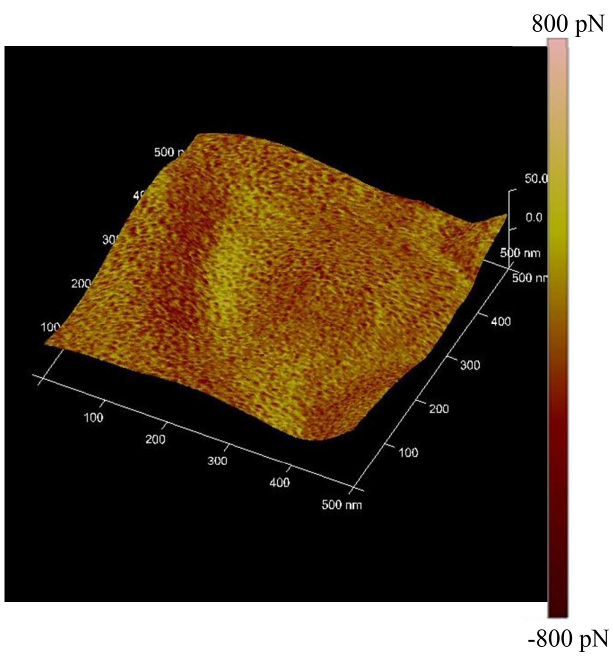
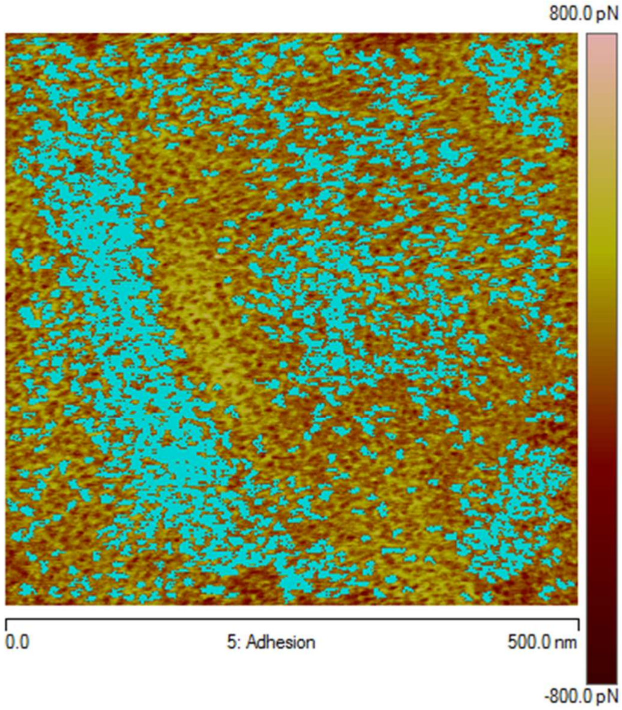
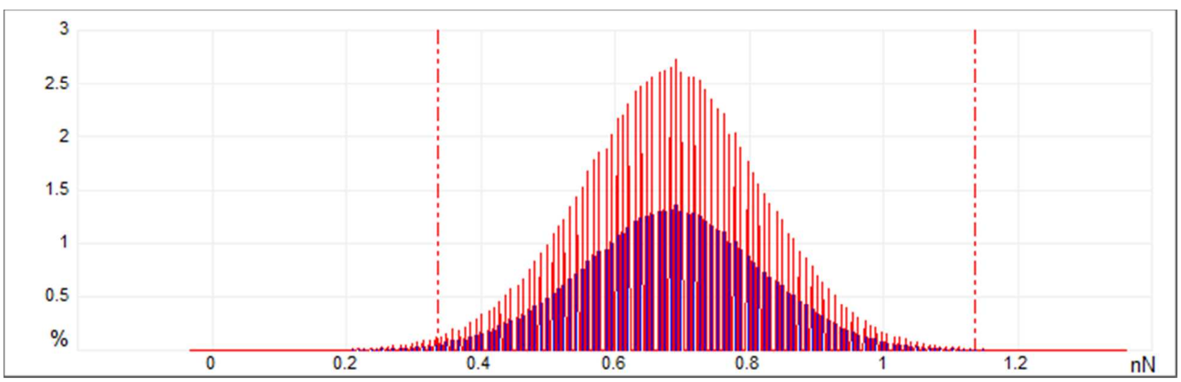


Figure S2. Height-adhesion overlay AFM images (500 nm x 500 nm) of **4c** in QNM mode.

2. Particle analysis based on adhesion maps from AFM





Parameter	Mean	Minimum	Maximum	Sigma
Total Count	580	580	580	0.00
Density	2000 (/μm^2)	2000 (/μm^2)	2000 (/μm^2)	0.00
Height	-0.3 (nN)	-0.6 (nN)	-0.1 (nN)	0.08 (nN)
Area	102.9 (nm^2)	23.8 (nm^2)	14816 (nm^2)	622.8 (nm^2)
Diameter	9.2 (nm)	5.5 (nm)	137.3 (nm)	6.8 (nm)

Figure S3. Particle analysis using an adhesion map. Top, Adhesion map with particles identified by NanoScope Analysis v1.2 software. Middle, Histogram of particle adhesion distribution. Bottom, Summary of analysis.

3. Energy dispersive X-ray analysis

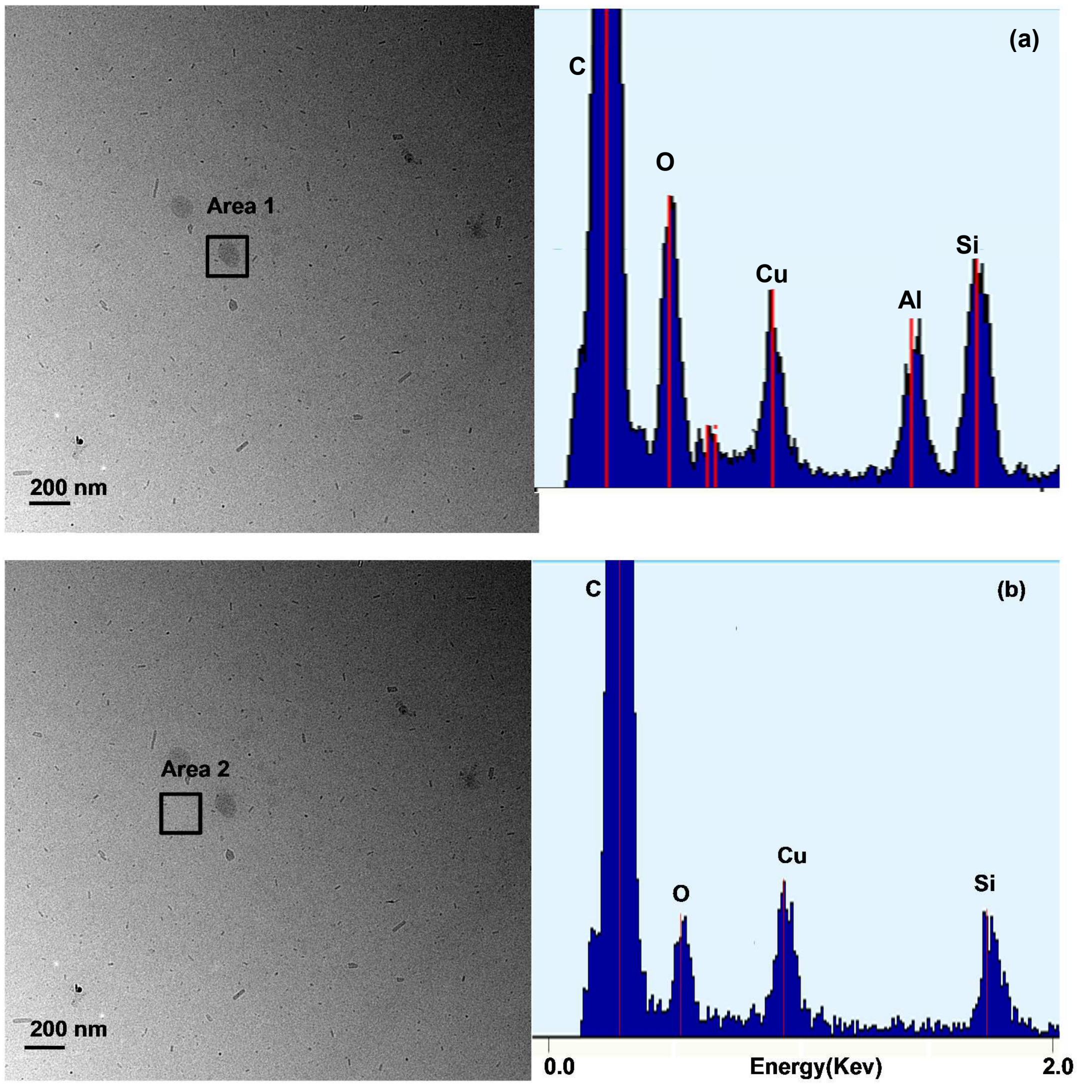


Figure S4. EDS of Areas 1 and 2 indicated by the squares. Area 1 is contaminated by Al which is most likely the residual of $EAlCl_2$ catalyst for the Alder ene reaction.

4. Derivation of the relationship of N_{agg} and K according to open association model.

We rewrite the open association as the following:

$U_x\text{-a} + \text{d-}U_y \leftrightarrow U_x\text{-ad-}U_y$

where d-U_x represents all aggregates of any degree of aggregation with a reactive end group “d”, U_y-a represents all aggregates of any degree of aggregation with a reactive end group “a”, and U_x-ad-U_y represents all aggregates of any degree of aggregation and contains reacted “ad” groups. Further, the equilibrium constant of the above process is *K*, the extent of reaction of either the reactive group “a” or “d” at equilibrium is *p*, and the number average degree of aggregation to be N_{agg} at eq, and $N_{agg} = (1-p)^{-1}$, and the initial concentration of the reactive groups “a” and “d” is the initial unimer concentation, $[U]_o$.

At equilibrium, the concentrations of the reactive groups “d” and “a” are both ($[U]_o - p[U]_o$), and the concentration of the reacted group “ad” is $p[U]_o$. Hence, the equilibrium constant can be expressed as:

$$K = p[U]_o/([U]_o - p[U]_o)^2$$

Substitute N_{agg} for *p*,

$$K = (N_{agg}^{\ 2} - N_{agg})/[U]_o$$

Solve for N_{agg},

$$N_{agg} = \frac{1}{2}\left[1 + (1 + 4\,K[U]_o)^{1/2}\right]$$

When N_{agg} is a relatively large number, $N_{agg} \approx (K[U]_o)^{1/2}$