Supporting Information

The development of bio-acrylic polymers from Cyrene™: transforming a green solvent to a green polymer

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Fig. S1 Stereo centers of Levoglucosanol (Cyrene-OH)

Fig S2 13C NMR of Cyrene
Fig. S3 $^{13}$C NMR of Cyrene-OH

Fig. S4 $^{13}$C NMR of m-Cyrene
Fig. S5 ATR-FTIR spectrum of m-Cyrene homopolymer

Fig. S6 DSC analysis of m-Cyrene homopolymer from bulk polymerization
Fig. S7 DSC analysis of m-Cyrene homopolymer by emulsion polymerization

![DSC analysis graph](image)

Tg = 192.83°C

Fig. S8 Polymerization kinetics of m-Cyrene in different solvents

![Polymerization kinetics graph](image)

- DMSO
- Cyrene
- GVL
- MIBK
Reactivity ratio calculation using Fineman-Ross (F-R) and Kelen-Tüdös (K-T) models

\[
\text{F-R model} \quad G = r_1 H - r_2
\]

\[
\text{K-T model} \quad \eta = \left[ r_1 + \frac{r_2}{\alpha} \right] \mu - \frac{r_2}{\alpha}
\]

where, \( G = F(f-1)/f \), \( H = F^2/f \), \( \eta = G/(\alpha + H) \), \( \mu = H/(\alpha + H) \), \( F = M_1/M_2 \), \( f = m_1/m_2 \)

\[ \alpha = (H_{\max}/H_{\min})^{1/2} \]

\( M_1 \) = mole fraction of m-Cyrene in feed, \( M_2 \) = mole fraction of IBMA in feed, 

\( m_1 \) = mole fraction of m-Cyrene in copolymer, \( m_2 \) = mole fraction of IBMA in copolymer,

\( r_1 \) = reactivity ratio of m-Cyrene, \( r_2 \) = reactivity ratio of IBMA.

Fig. S9 (a) F-R model and (b) K-T model

In F-R and K-T models, \( G \) is plotted against \( H \) (Fig S8.a) and \( \eta \) is plotted against \( \mu \) (Fig S8.b) respectively. \( G \) vs \( H \) plot gives a straight line with \( r_1 \) as slope and \(-r_2\) as the intercept. Similar plot of \( \eta \) vs \( \mu \) provides \( \left[ r_1 + \frac{r_2}{\alpha} \right] \) as a slope and \((-r_2/\alpha)\) as its intercept.