Supporting Information

Film formation of high $T_g$ latex using hydroplasticization: Explanations from NMR relaxometry

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Dry $T_g$ measurements - Modulated differential scanning calorimetry (MDSC)

Table S1. MDSC temperature program

| Start temperature (°C) | End temperature (°C) | Temperature ramp (°C/min) | Isothermal period (min) | Temperature modulation (°C) | Modulation period (s) |
|------------------------|----------------------|---------------------------|-------------------------|-----------------------------|-----------------------|
| 40                     | -85                  | 20                        | 10                      | -                           | -                     |
| -85                    | 160                  | 3                         | 5                       | 2                           | 60                    |
| 160                    | -85                  | 20                        | 5                       | -                           | -                     |
| -85                    | 160                  | 3                         | -                       | 2                           | 60                    |

Table S2. Summary of the results obtained by MDSC from dry copolymer films

| MAA Composition (%) | $T_g$, half width [°C] | $T_g$, onset [°C] | $T_g$, end [°C] | Enthalpy [J/g°C] |
|---------------------|------------------------|-------------------|----------------|------------------|
| 2                   | 25.9                   | 19.2              | 32.6           | 0.27             |
| 5                   | 30.2                   | 23.0              | 37.4           | 0.23             |
| 10                  | 37.3                   | 28.4              | 46.2           | 0.29             |
| 15                  | 46.9                   | 36.0              | 57.8           | 0.22             |
| 20                  | 50.2                   | 36.8              | 63.7           | 0.39             |
Figure S1. Thermograms for the dry copolymer films with varying MAA content as noted.
Wet $T_g$ measurements - Modulated differential scanning calorimetry (MDSC)

Table S3. MDSC temperature program

| Start temperature (°C) | End temperature (°C) | Temperature ramp (°C/min) | Isothermal period (min) | Temperature modulation (°C) | Modulation period (s) |
|------------------------|----------------------|----------------------------|-------------------------|-----------------------------|-----------------------|
| 40                     | 75                   | 20                         | 15                      | -                           | -                     |
| 75                     | 5                    | 10                         | 5                       | -                           | -                     |
| 5                      | 90                   | 3                          | 5                       | 2                           | 60                    |

Table S4. Solids Content of Wet Latex Samples

| Copolymer MAA Composition (%) | Solids Content [wt-%] |
|-------------------------------|-----------------------|
| 2                             | 61                    |
| 5                             | 54                    |
| 10                            | 50                    |
| 15                            | 37                    |

Table S5. Summary of the Results Obtained by MDSC from Wet Samples

| MAA Composition [%] | $T_g$, half width [°C] | $T_g$, onset [°C] | $T_g$, end [°C] | Enthalpy [J/g°C] |
|---------------------|------------------------|-------------------|-----------------|------------------|
| 2                   | 18.4                   | 14.6              | 22.3            | 0.14             |
| 5                   | 18.6                   | 14.5              | 22.6            | 0.11             |
| 10                  | 19.1                   | 15.0              | 23.2            | 0.11             |
| 15                  | 19.3                   | 16.6              | 22.1            | 0.05             |
| 20                  | Not measured           | Not measured      | Not measured    | Not measured     |
Figure S2 Thermogram for wet copolymer film with varying MAA concentrations, as noted.