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ARTICLE TYPE

A Novel Alkali and Cosolvent Thickening Mechanism for Latex

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Supporting Information

Table S1 Surface carboxyl groups concentration for dilute A1 and A2 (1.0 wt%).

	Consumption of NaOH (ml)	Surface carboxyl groups concentration (mol/L)
A1	7.82	0.0015
A2	16.60	0.0033

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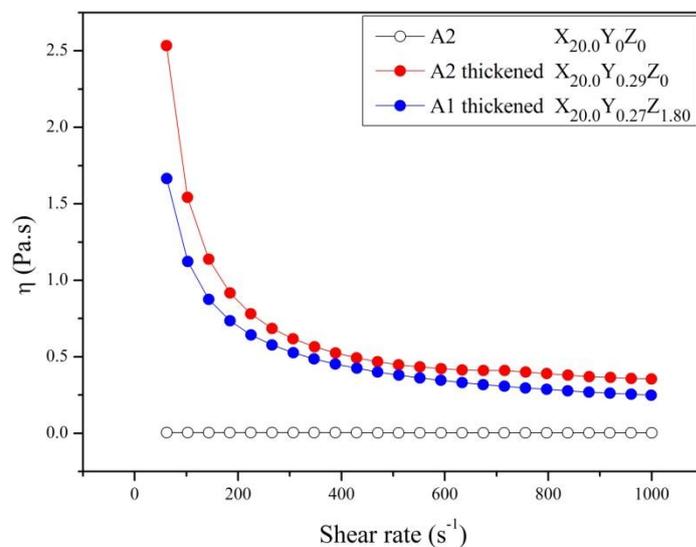


Fig. S1 Dependence of viscosity (η) on shear rate for thickened dispersion of A2 (fully neutralized with DMEA) and A1 (fully neutralized and added with 9 wt% EGBE).

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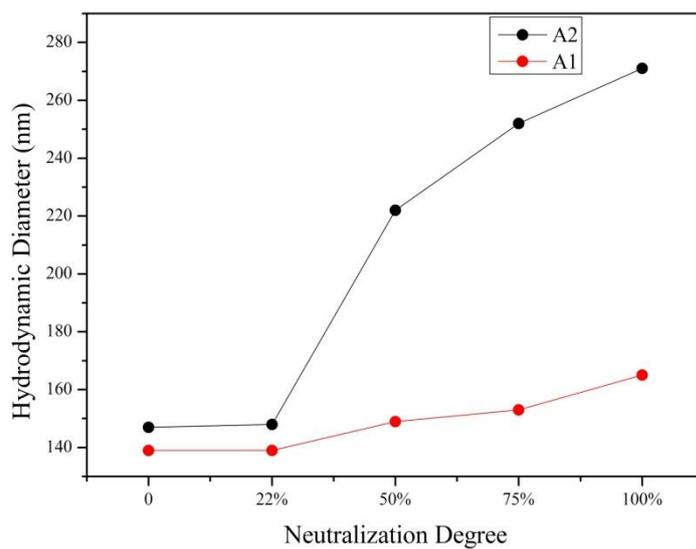


Fig. S2 Hydrodynamic diameter as a function of neutralization degree for A2 and A1.

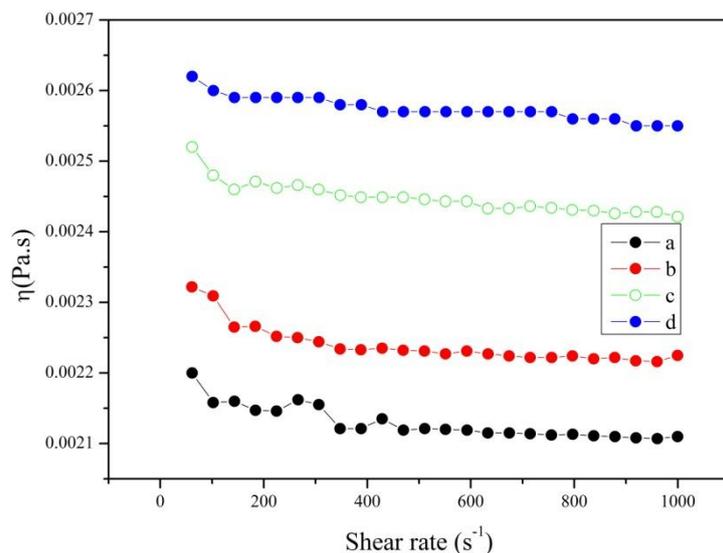


Fig. S3 Shear viscosity (η) of A3 treated with different reagents, (a) A3 added with DMEA (100% neutralization degree), $X_{20.0}Y_{0.27}Z_0$, (b) A3, $X_{20.0}Y_0Z_0$, (c) A3 added with 9 wt% EGBE, $X_{20.0}Y_0Z_{1.80}$, (d) A3 added with DMEA (100% neutralization degree) and 9 wt% EGBE, $X_{20.0}Y_{0.27}Z_{1.80}$.

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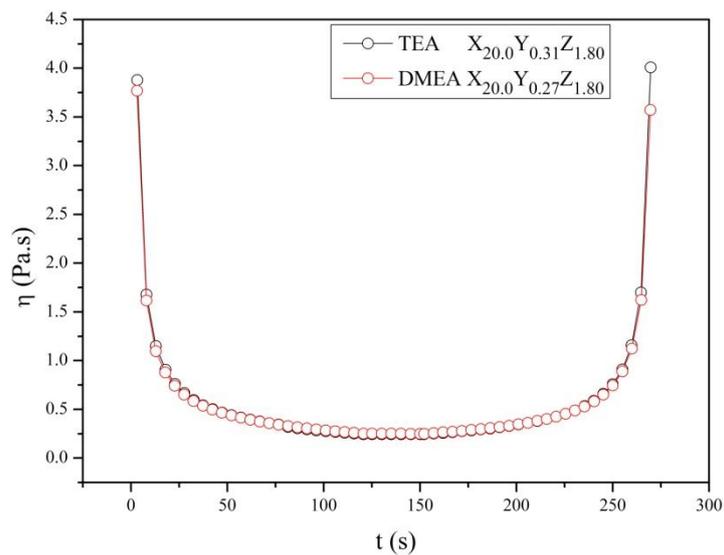


Fig. S4 Shear reversibility of the thickened dispersion of A1 which is neutralized by different alkalis.

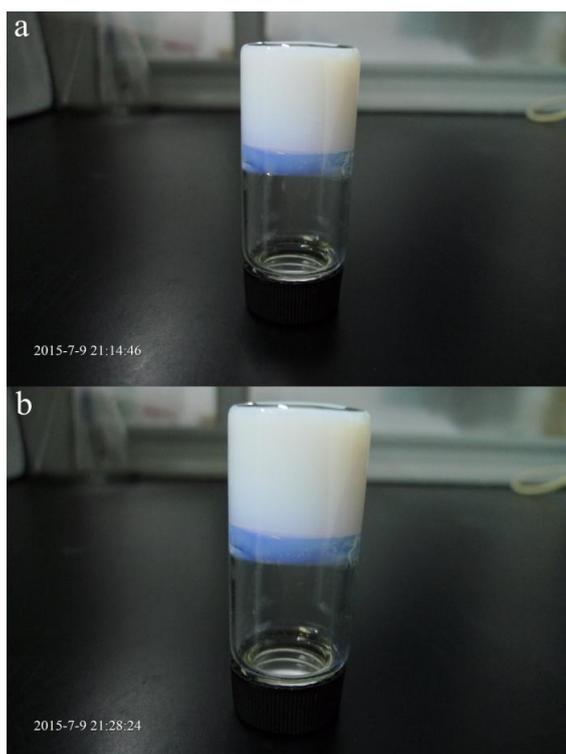


Fig. S5 Inverted and thickened dispersion of A1 (fully neutralized and added with 11 wt% EGBE)

before and after 14 mins, $X_{20.0}Y_{0.27}Z_{2.20}$.

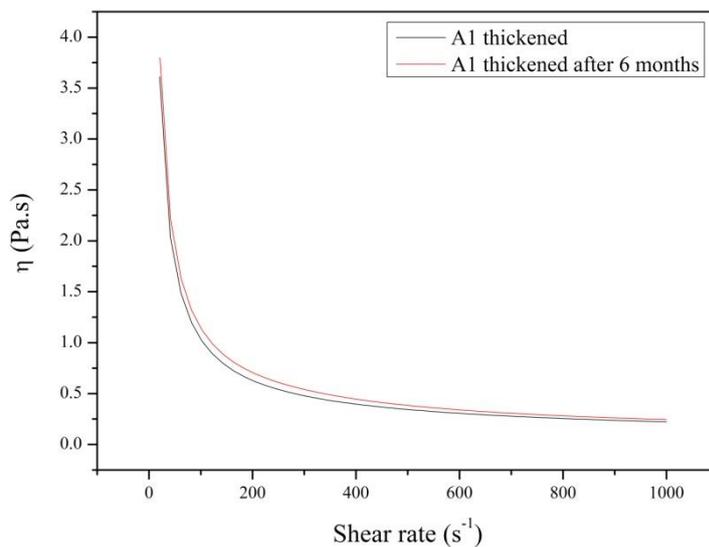


Fig. S6 Dependence of viscosity (η) on shear rate for the thickened dispersion of A1 before and after 6

months, $X_{20.0}Y_{0.27}Z_{1.80}$.

Synthetic method of B1:

The acrylic latex was synthesized via seed emulsion polymerization. The reaction was carried out under nitrogen atmosphere, using a 1-L four-neck flask equipped with a condenser, a mechanical stirrer and a digital thermometer. 0.32 g APS was dissolved in 16 g deionized water to prepare the initiator solution (1.96 wt%).

Firstly, 182 g deionized water and all emulsifiers including SLS and AHPS were charged into the flask and heated to 76 °C under stirring, then 10 wt% mixture of all MMA and BA based on the table below and 4 g initiator solution were fed into the flask and stirred for 0.5 h, the resultant dispersion was used as seed latex. Secondly, MAA was mixed with the residual MMA and BA, the monomers mixture and 12 g initiator solution were then added dropwise to the same flask with two constant pressure dropping funnels respectively, and the dropping process lasted for 1.5 h. Later the temperature of the system was maintained at 76 °C for another 2 h to ensure complete monomer conversion, thus finishing the polymerization. Finally the latex was filtered with 400 mesh filter cloth and cooled to room temperature.

Table S2 Recipe and basis properties of the acrylic latex B1

Recipe	B1
MMA/g	52.0
BA/g	26.0
MAA/g	5.0
MAA Content (%)	6.02
Solid content (%)	28.5
Conversion (%)	98.7
Mn	2.3×10^5
Mw/Mn	1.30

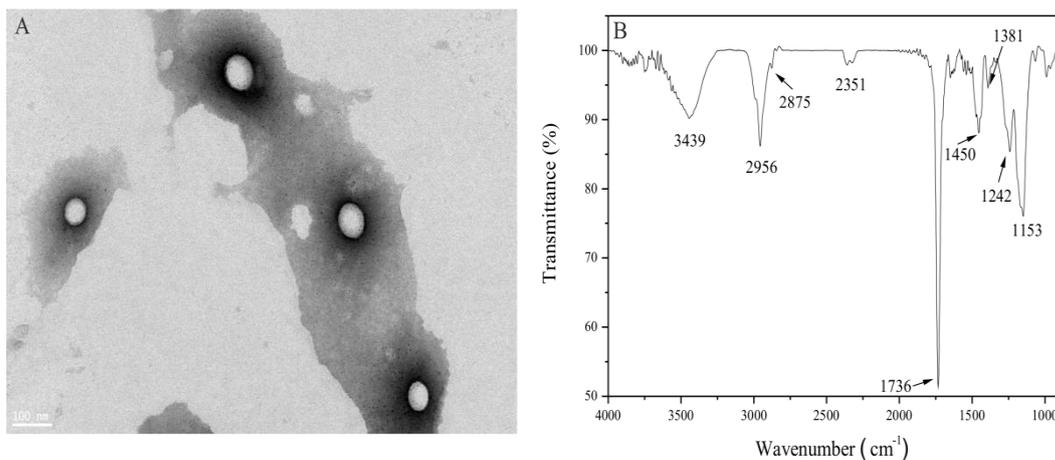


Fig. S7 Structure characterization of B1, (A) TEM image of B1, (B) FT-IR spectra of B1.

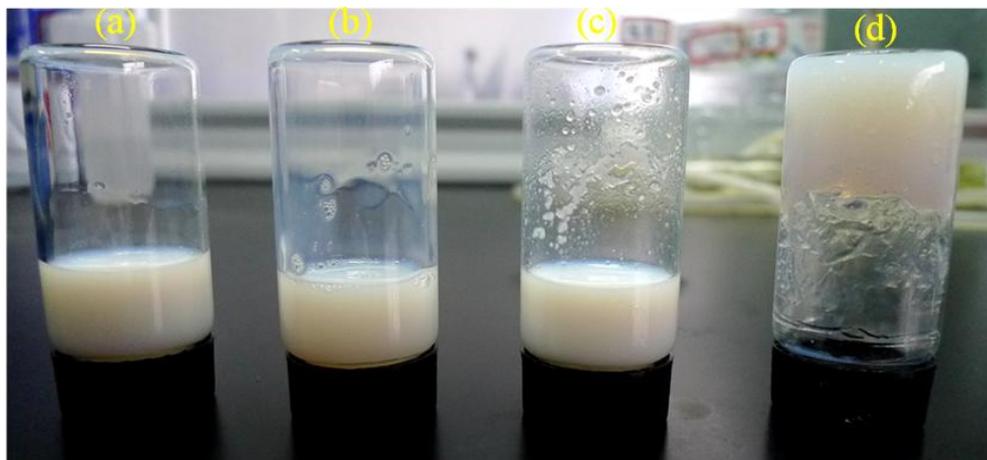
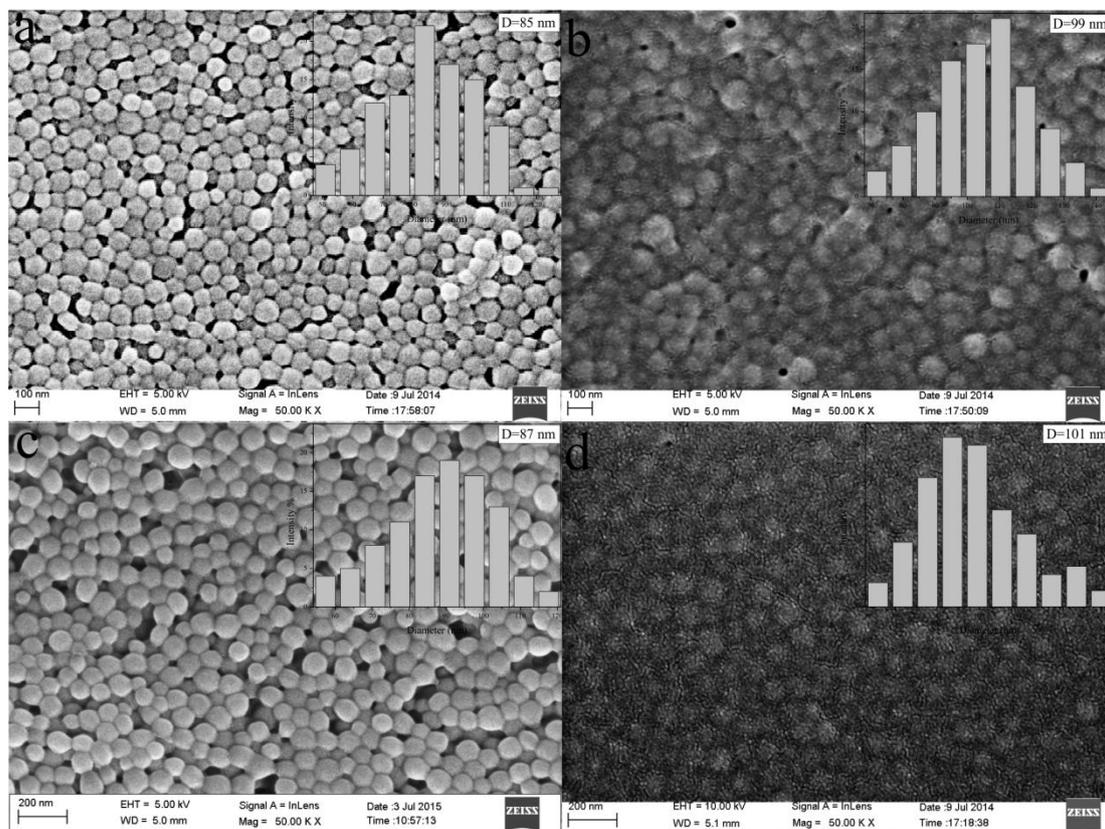


Fig. S8 Thickening process of B1, (a) B1, $X_{20.0}Y_0Z_0$, (b) B1 added with DMEA (100% neutralization degree), $X_{20.0}Y_{0.37}Z_0$, (c) B1 added with 3 wt% EGBE, $X_{20.0}Y_0Z_{0.60}$, (d) B1 added with both DMEA (100% neutralization degree) and 3 wt% EGBE, $X_{20.0}Y_{0.37}Z_{0.60}$.



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Fig. S9 SEM images of B1 treated with different reagents, (a) B1, $X_{20.0}Y_0Z_0$, (b) B1 treated with DMEA (100% neutralization degree), $X_{20.0}Y_{0.37}Z_0$, (c) B1 treated with 3wt% EGBE, $X_{20.0}Y_0Z_{0.60}$, (d) B1 treated with both of DMEA (100% neutralization degree) and EGBE (3wt%), $X_{20.0}Y_{0.37}Z_{0.60}$.