

Supporting information for: Microscopic viscoelasticity of polymer solutions and gels observed from translation and rotation of anisotropic colloid probes

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Fig. 1 shows time correlation functions of depolarized scattered electric field for LCP tracers in PAA sols and gels on increase of the cross-linker fraction f_{bis} .

Fig. 2 shows the time correlation functions of depolarized scattered electric field for LCP tracers in xanthan solutions gels on increase of the polymer concentration.

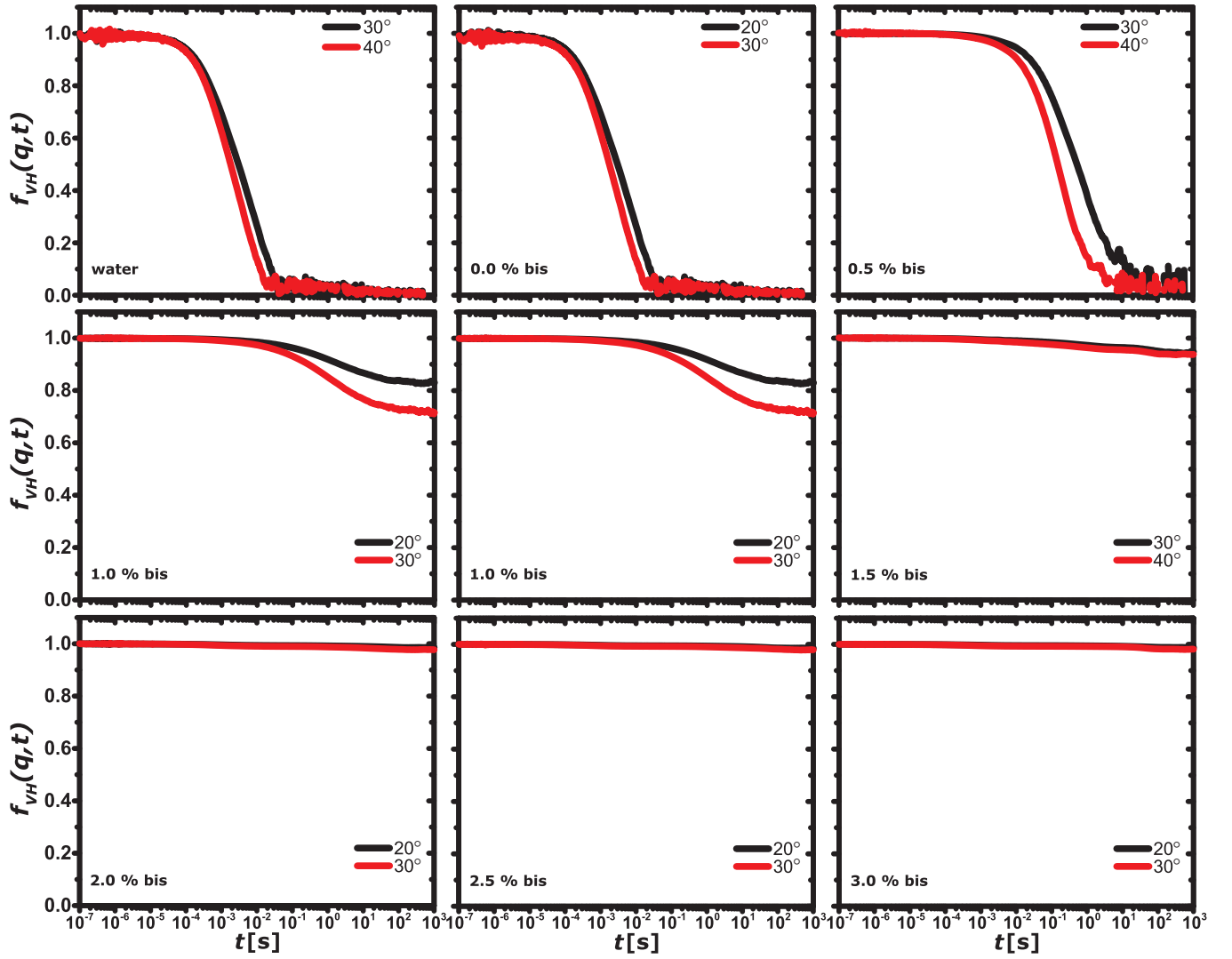


FIG. 1: Time correlation functions of depolarized scattered electric field for LCP traces in PAA sols and gels on increase of cross-linker fraction f_{bis} as indicated in the key. Two measurements at different angles, as indicated in the key, are made to calculate translational and rotational MSDs.

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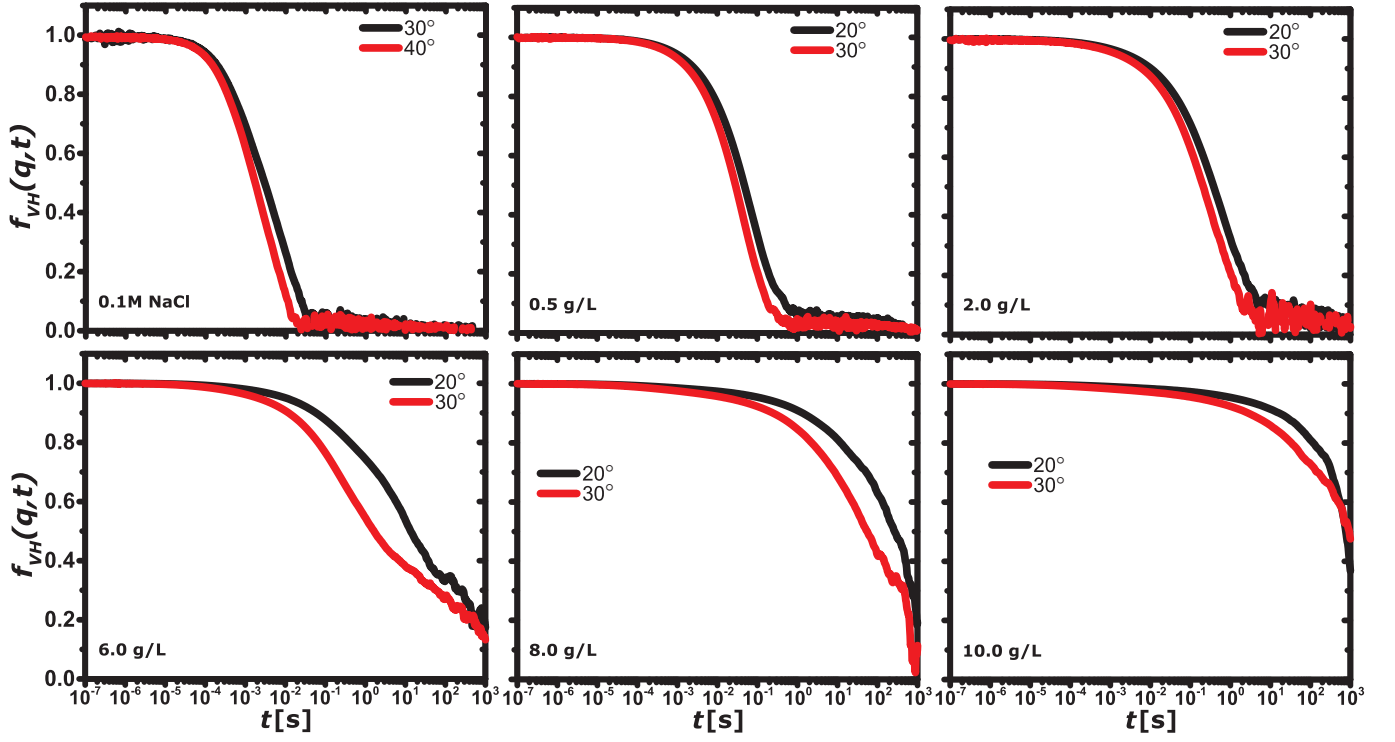


FIG. 2: Time correlation functions of depolarized scattered electric field for LCP traces in xanthan solutions on increase of polymer concentration as indicated in the key. Two measurements at different angles, as indicated in the key, are made to calculate translational and rotational MSDs.

Figs. 3 and 4 show viscoelastic moduli obtained from rotational and translational MSDs for PAA sols and gels and for xanthan solutions.

Fig. 5 shows the decoupling of rotation from translation in PAA gels starting from $f_{bis} = 1.5\%$. Solid lines represent TMSDs calculated from RMSD as follows: $\langle \delta r^2(t) \rangle = 2a^2 \langle \delta \theta^2(t) \rangle$, where $a = R_h = 175.3$ nm is the tracer hydrodynamic radius.

Fig. 6 shows the chemical structure of RM257 and its alignment in a spherical particle.

Fig. 7 shows the time correlation functions of depolarized scattered electric field for LCP tracers in water before and after polymer adsorption.

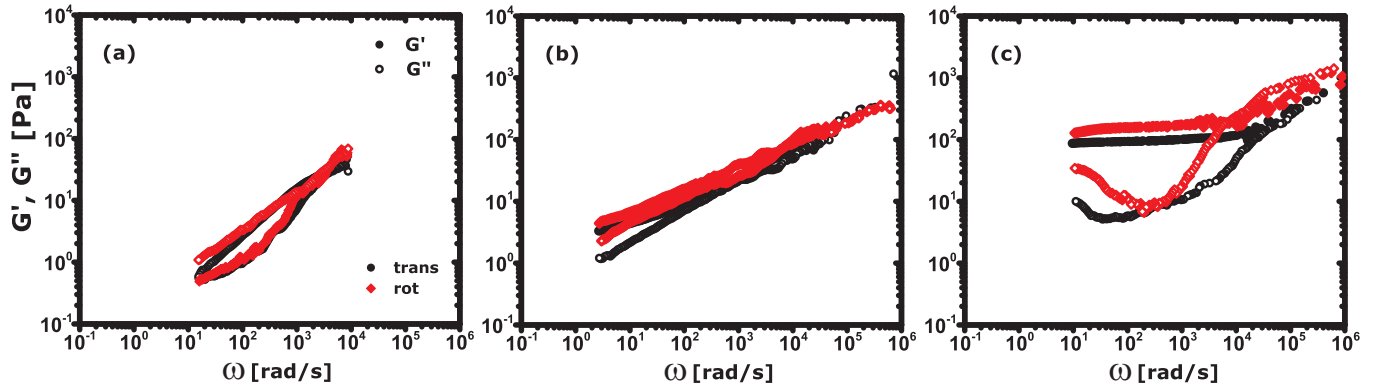


FIG. 3: Viscoelastic moduli G' (filled symbols) and G'' (open symbols) obtained from translational (circles) and rotational (diamonds) MSDs of the tracers in PAA networks on variation of the cross-linker mass fraction f_{bis} : (a) 0.5%, (b) 1.0% and (c) 3.0%.

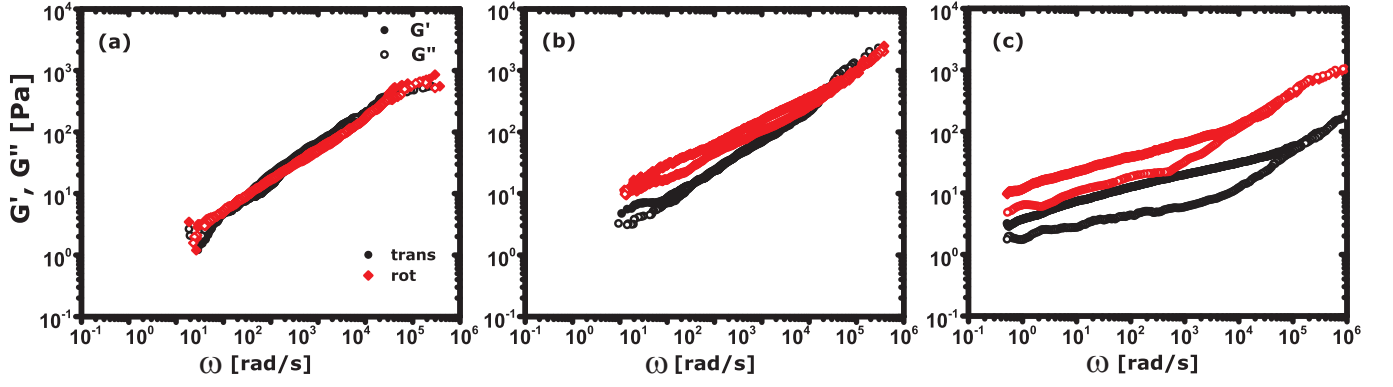


FIG. 4: Viscoelastic moduli G' (filled symbols) and G'' (open symbols) obtained from translational (circles) and rotational (diamonds) MSDs of the tracers in xanthan solutions at three concentrations: (a) 2.0 g/L, (b) 6.0 g/L and (c) 10.0 g/L.

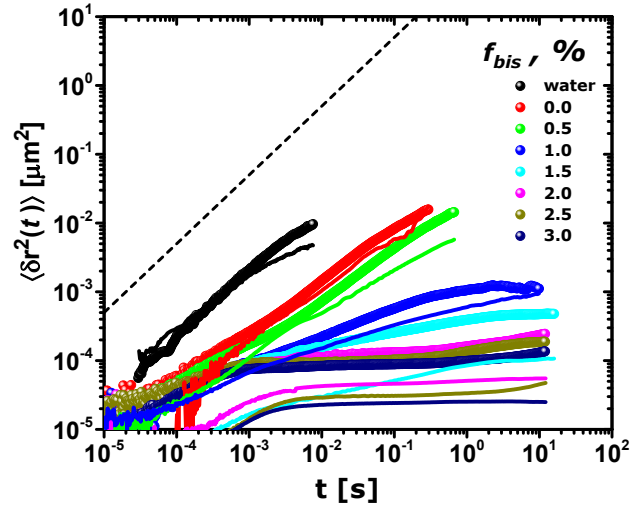


FIG. 5: Translational MSD of the tracers in PAA networks on variation of cross-linker mass fraction f_{bis} as given in the key. Symbols: obtained from the TCFs, solid lines: obtained from RMSD multiplying it by $2a^2$.

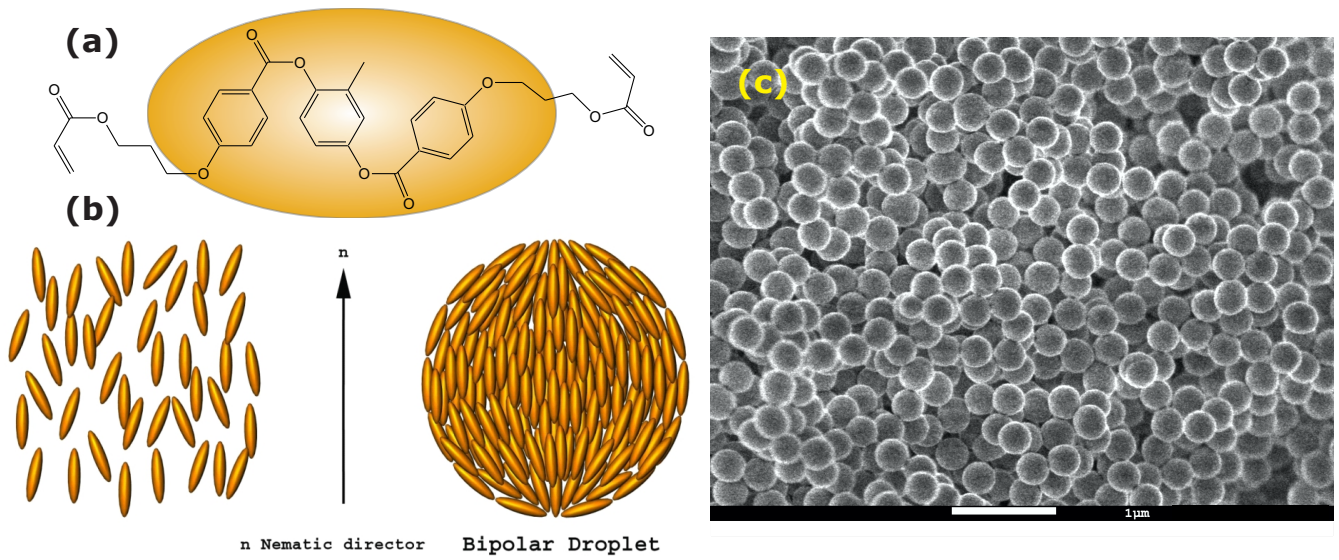


FIG. 6: (a) Chemical structure of the liquid crystal molecule RM257, (b) its alignment in a spherical particle used as a tracer and (c) SEM micrograph of LCP tracers.

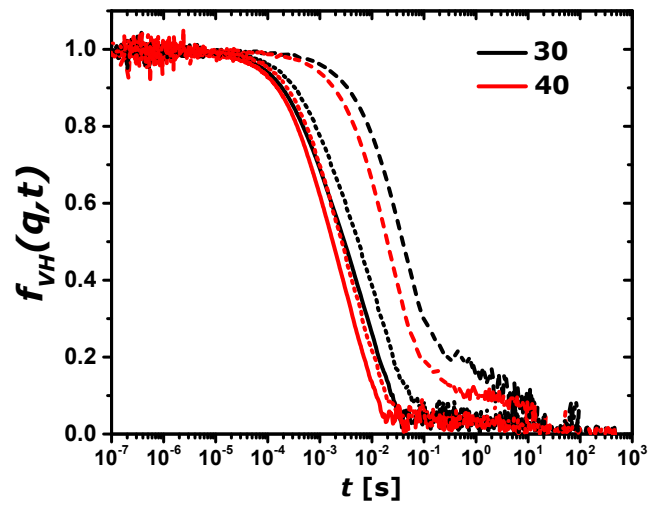


FIG. 7: Time correlation functions of depolarized scattered electric field measured at two different scattering angles, as given in the key, in water before (solid lines) and after PAA (dashed lines) and xanthan (dotted lines) adsorption.