
Supplementary Material

Regulatory mechanism of opposite charges on chiral self-assembly of cellulose nanocrystals

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Supplementary Figures

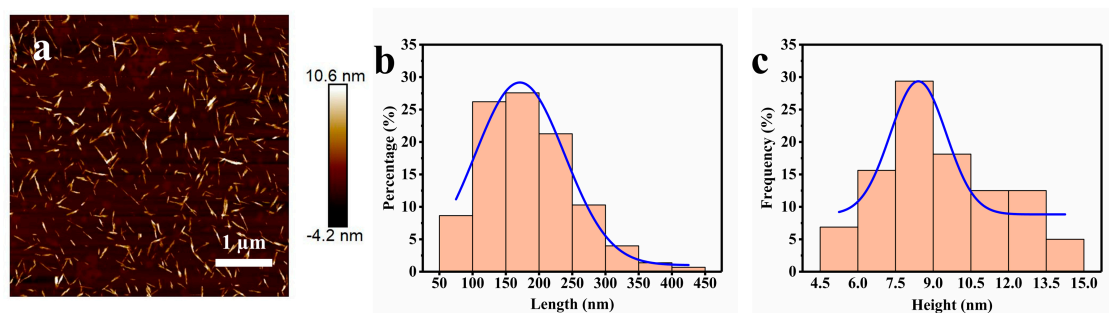


Figure S1. (a) AFM images of CNCs, and (b) the length distribution and (c) height distribution, respectively.

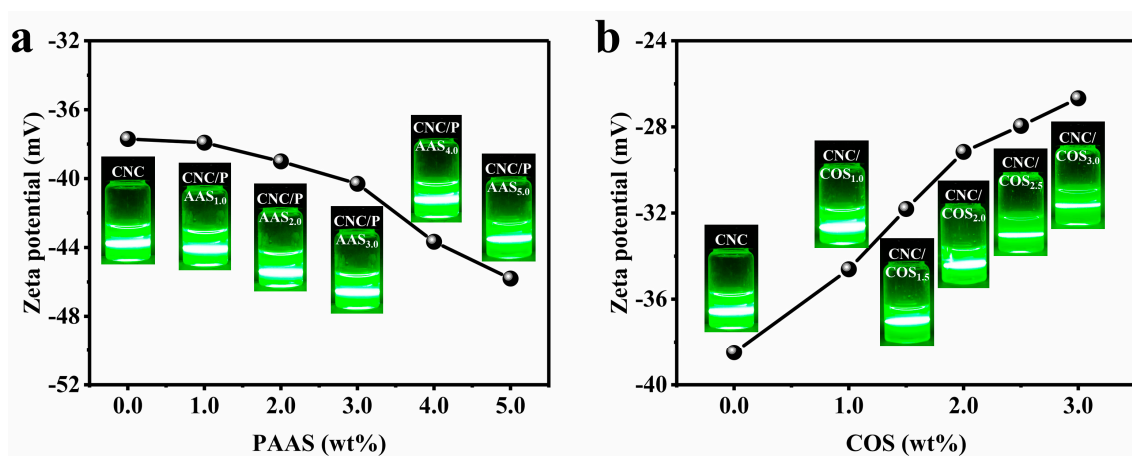


Figure S2. Zeta potential and the Tyndall effect of (a) CNC/PAAS mixtures and (b) CNC/COS mixtures, respectively.

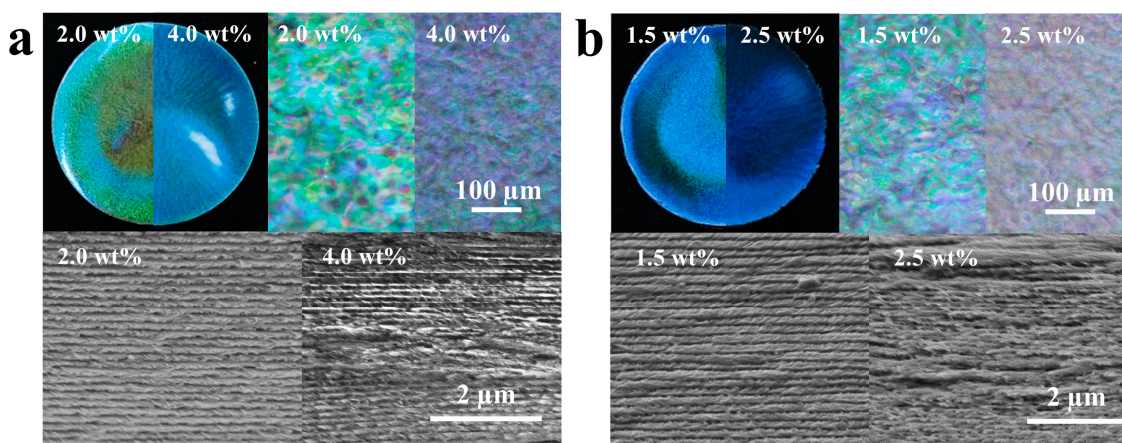


Figure S3. The optical photographs (top left), POM patterns (top right) and SEM images (below) of (a) CNC/PAAS films (the ratio of PAAS is 2.0 wt%, 4.0 wt% in order, from left to right), and (b) CNC/COS films (the ratio of COS is 1.5 wt%, 2.5 wt%).

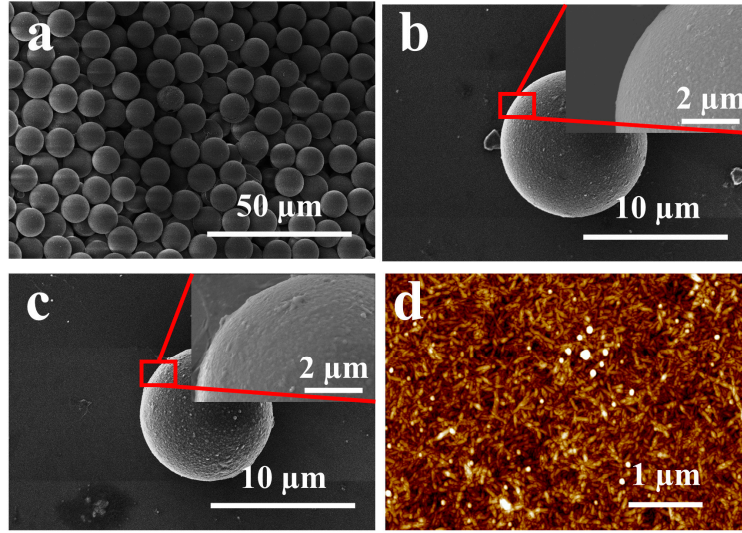


Figure S4. SEM images of (a) the amino silica microspheres, (b) the CNC/PAAS-modified silica microsphere, and (c) the CNC/COS-modified silica microsphere. (d) AFM images of CNC/COS-coated substrate.

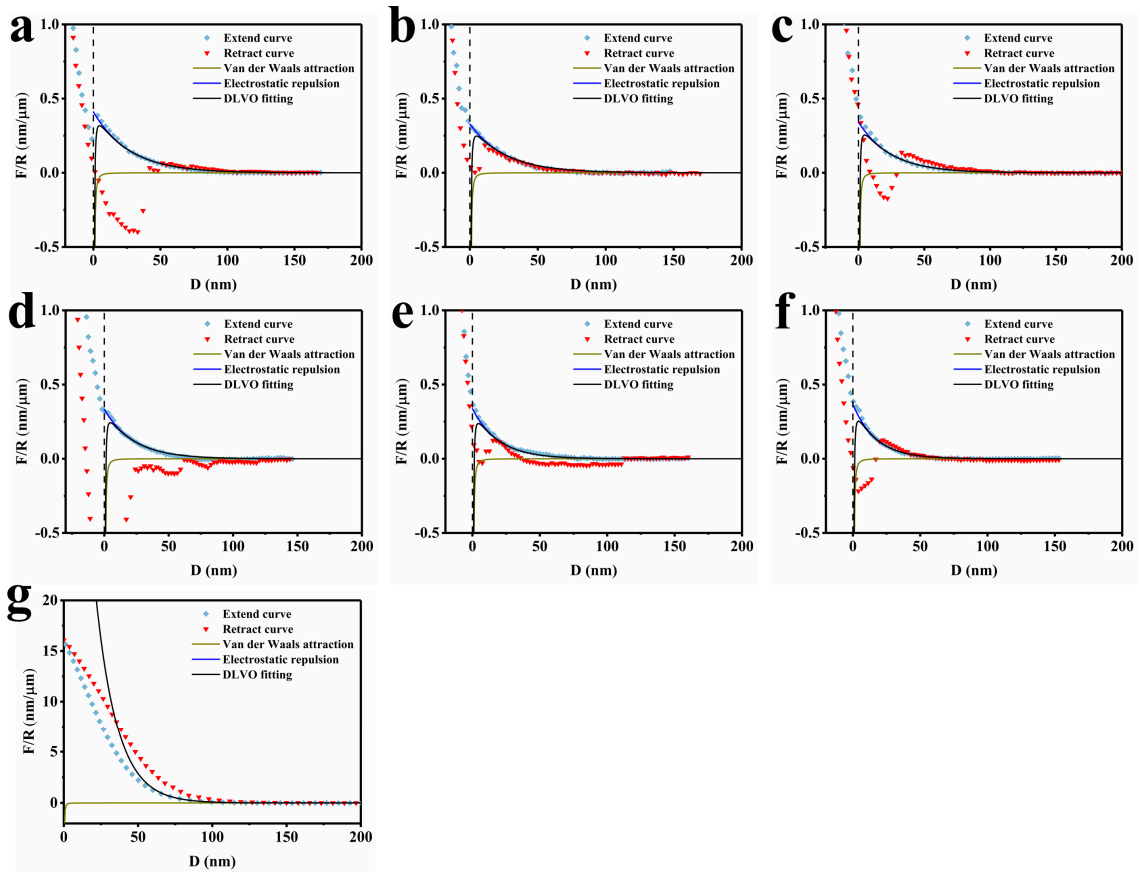


Figure S5. The force-distance curves and the DLVO fitting curves of (a) PAAS-CNC, CNC/COS-CNC/COS with (b) 1.0 wt%, (c) 1.5 wt%, (d) 2.0 wt%, (e) 2.5 wt%, and (f) 3.0 wt% COS addition, and (g) PAAS-PAAS, respectively.

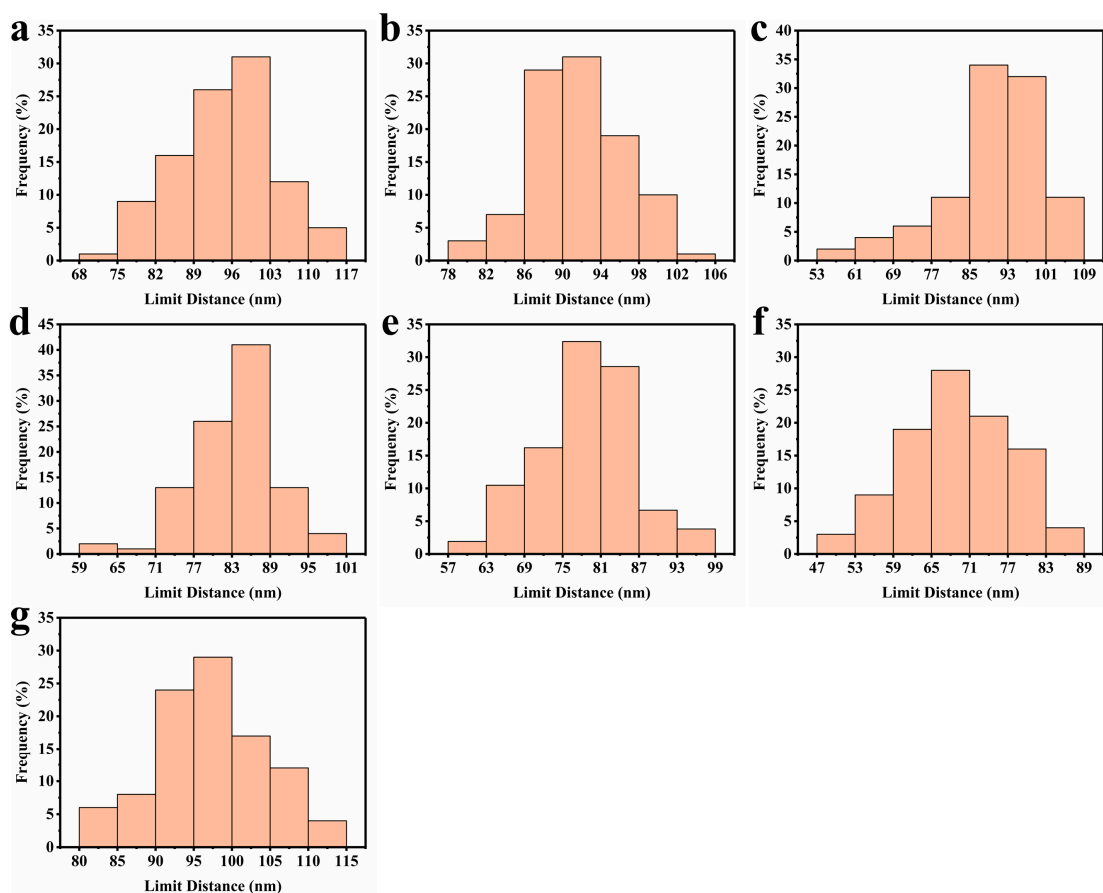


Figure S6. Limit distance of the interaction of different groups of samples based on the fitted curves. (a) CNC-CNC. CNC/COS-CNC/COS with (b) 1.0 wt%, (c) 1.5 wt%, (d) 2.0 wt%, (e) 2.5 wt%, and (f) 3.0 wt% COS addition, respectively. (g) PAAS-CNC.

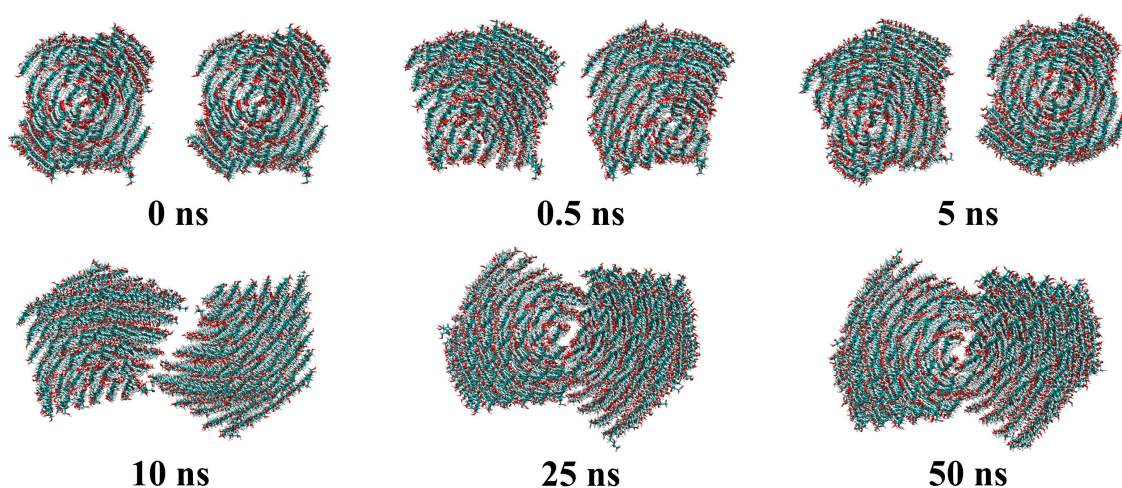


Figure S7. Cross-sectional view of the dimer structural equilibrium process.

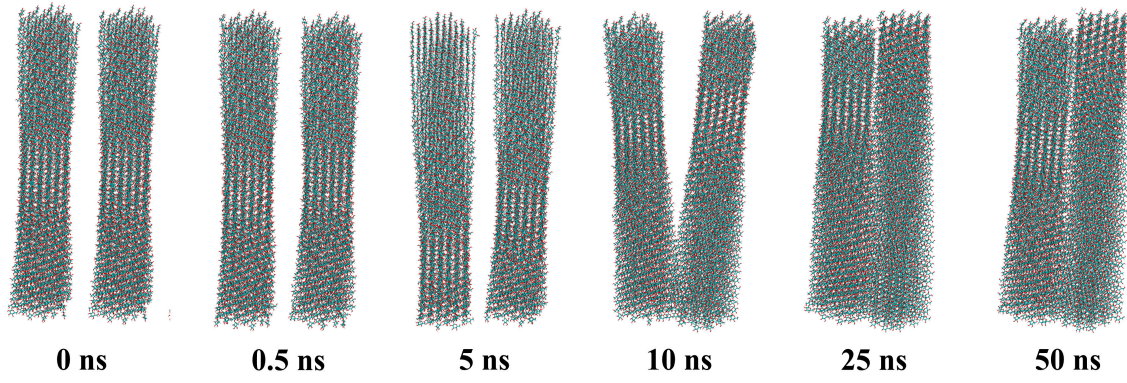


Figure S8. Side view of the dimer structural equilibrium process.

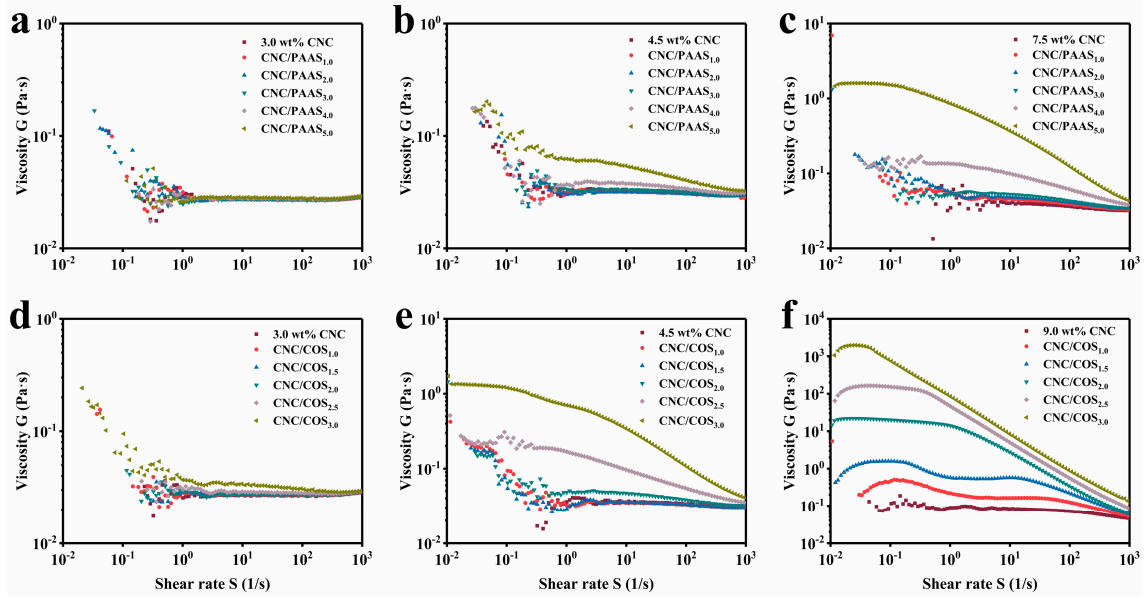


Figure S9. The steady viscosity of CNC/PAAS mixtures at (a) 3.0 wt%, (b) 4.5 wt%, and (c) 7.5 wt% concentration, respectively. The steady viscosity of CNC/COS mixtures at (d) 3.0 wt%, (e) 4.5 wt%, and (f) 9.0 wt% concentration, respectively.

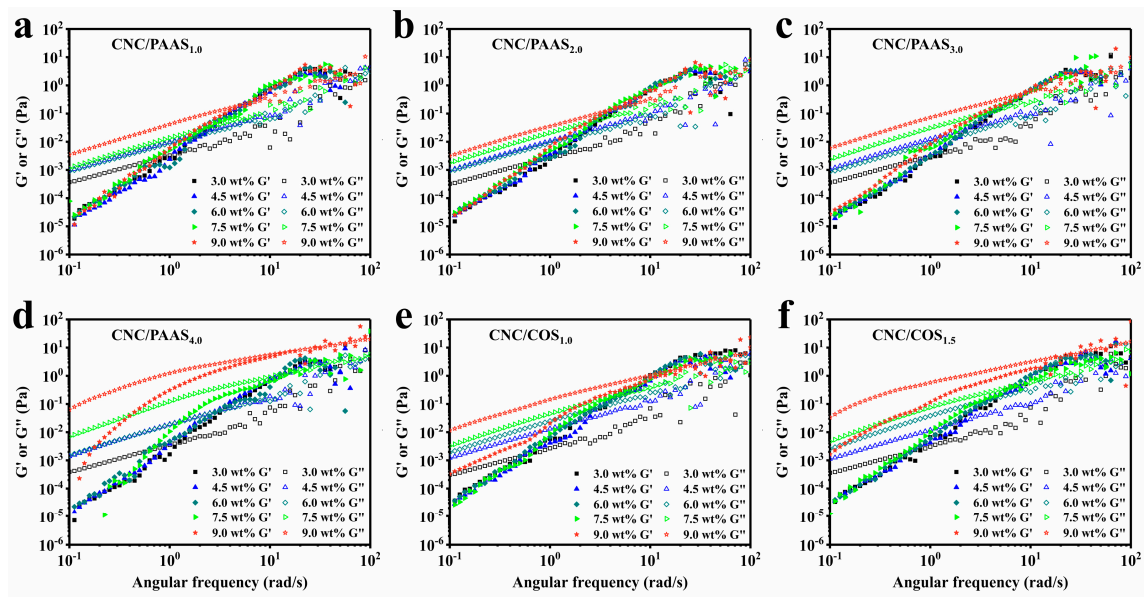


Figure S10. (a)-(d) Dependence of G' and G'' as a function of the angular frequency for CNC/PAAS mixtures with 1.0 wt%-4.0 wt% PAAS addition. (e)-(f) Dependence of G' and G'' as a function of the angular frequency for CNC/COS mixtures with 1.0 wt% and 1.5 wt% COS addition, respectively.