



Figure A2. Molecular dynamics (MD) simulation protocol of rods (blue beads) in solution (red beads). The initial configuration is compressed to a final total number density of $0.85\sigma^3$ (step 1), then NPT simulation was performed at a set pressure of $8.45k_B T/\sigma^3$ (step 2), then NVT simulation is performed at the volume equal to the average volume of the NPT simulation (step 3). Finally, NEMD simulation is performed by deforming the simulation box at a constant shear rate, $\dot{\gamma}$ (step 4).