Supporting Information

Influence of Polymer Chain Length and Concentration on the Deposition Patterns of Linear Diblock Copolymer Solution Nanodroplets

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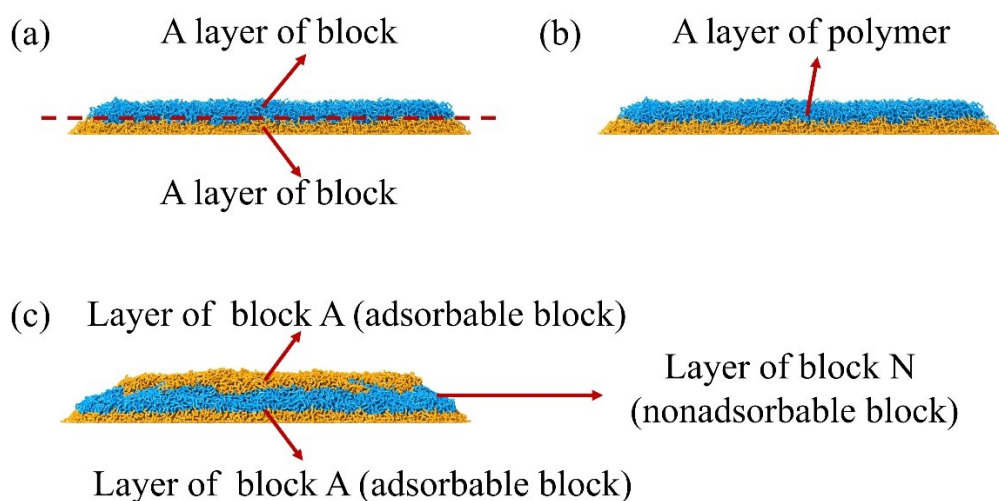
Figure S1. The illustration of the definition of layers in the deposition pattern. There are two different layers in the current work. (a) The layer of the block. Each layer consists of a block type. The dashed line sketches the boundary between two layers of the block. (b) The layer of the polymer. Structures are the same in (a) and (b). The droplet consists of the nonadsorbable-adsorbable copolymer solution with an initial polymer concentration of 0.1 and a chain length of 28 on the lyophilic wall. (c) Layers of adsorbable and nonadsorbable blocks. The droplet consists of the nonadsorbable-adsorbable copolymer solution with an initial polymer concentration of 0.3 and a chain length of 22 on the lyophilic wall. The bottom layer can also be the strong adsorbable block (block S). In that case, the layer is named as
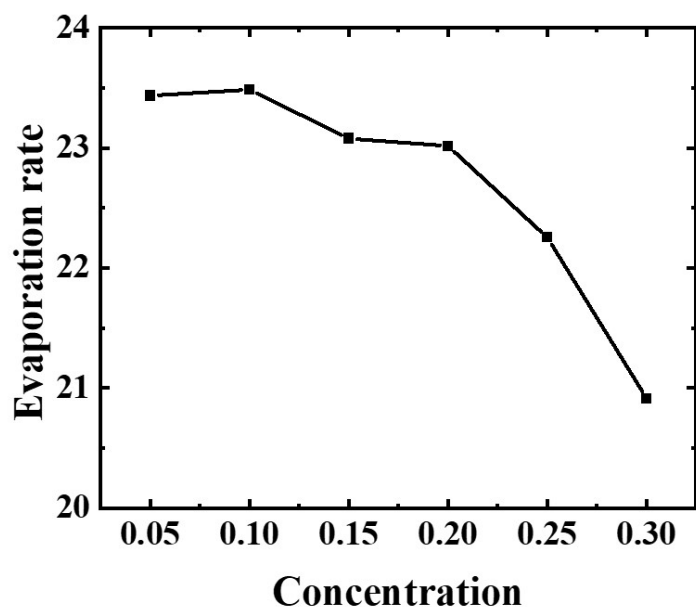
a layer of block S.

Figure S2. Evaporation rates of various polymer concentrations at the beginning of the evaporation. They are calculated as the slope of the number of solvent beads with time. The droplet consists of the nonadsorbable-strong adsorbable copolymer solution on the lyophobic wall. The chain length is 28.
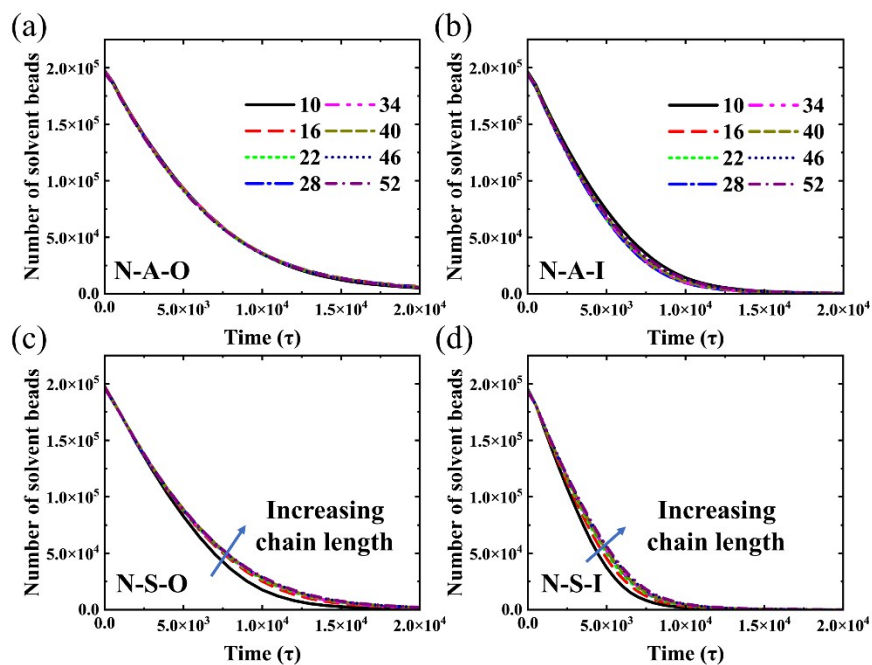

Figure S3. The time evolution of the number of solvent beads in the droplet with different chain lengths: (a) nonadsorbable-adsorbable copolymer solution droplet on the lyophobic

wall (N-A-O); (b) nonadsorbable-adsorbable copolymer solution droplet on the lyophilic wall (N-A-I); (c) nonadsorbable-strong adsorbable copolymer solution droplet on the lyophobic wall (N-S-O); (d) nonadsorbable-strong adsorbable copolymer solution droplet on the lyophilic wall (N-S-I). The polymer concentration is 0.15.
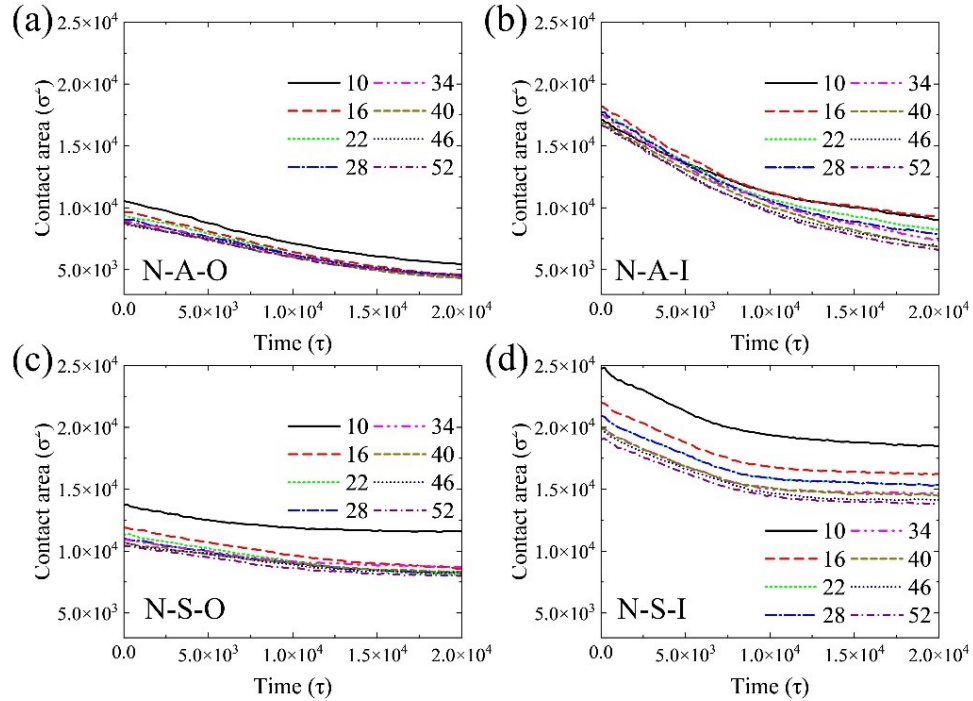

Figure S4. The time evolution of the contact area with different chain lengths: (a) nonadsorbable-adsorbable copolymer solution droplet on the lyophobic wall; (b) nonadsorbable-adsorbable copolymer solution droplet on the lyophilic wall; (c) nonadsorbable-strong adsorbable copolymer solution droplet on the lyophobic wall; (d) nonadsorbable-strong adsorbable copolymer solution droplet on the lyophilic wall. The polymer concentration is 0.15.
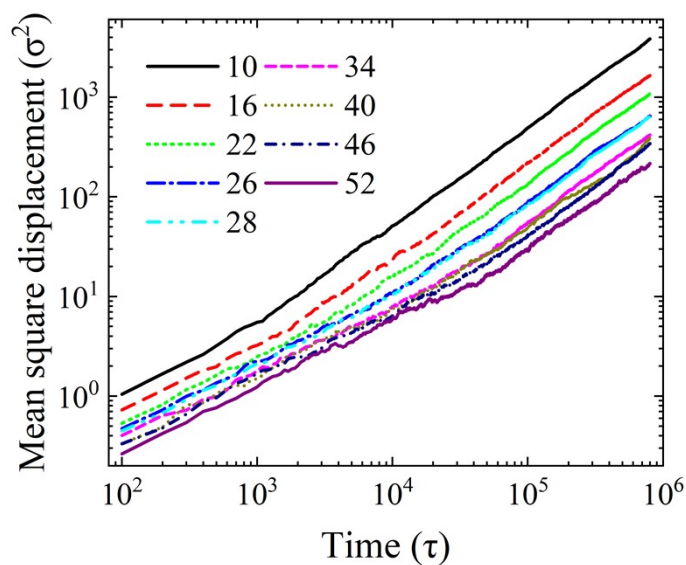
Figure S5. Mean square displacement of the polymer with the chain length from 10 to 52. The interaction between block Pa and Pb (ε_{PaPb}) is 0.6. The simulation system is comprised of pure polymer chains.
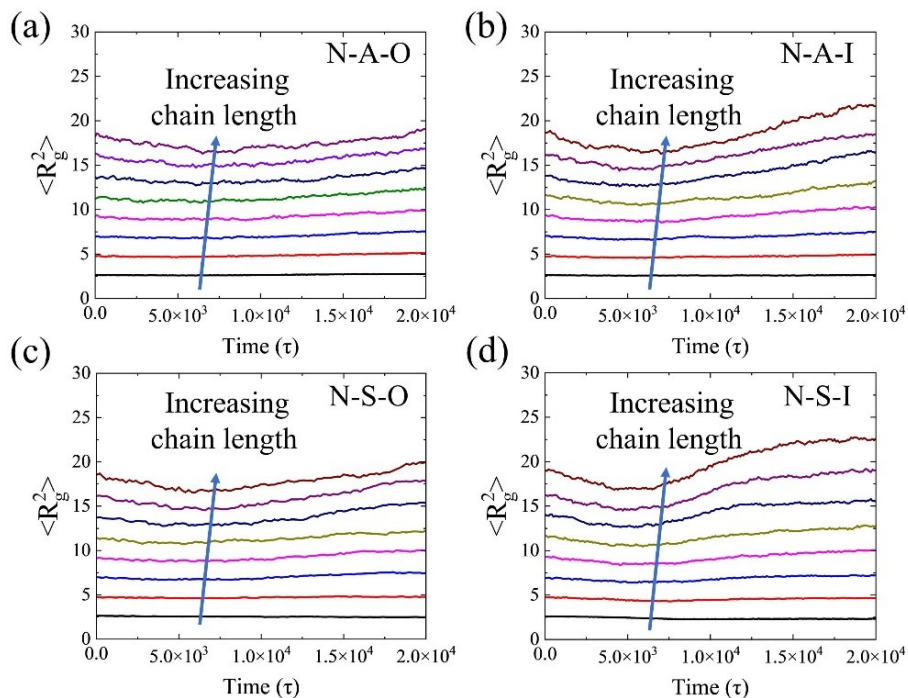

Figure S6. The time evolution of the mean-square radius of gyration ($\langle R_g^2 \rangle$) with various chain lengths: (a) nonadsorbable-adsorbable copolymer solution droplet on the lyophobic wall; (b) nonadsorbable-adsorbable copolymer solution droplet on the lyophilic wall; (c) nonadsorbable-strong adsorbable copolymer solution droplet on the lyophobic wall; (d)

nonadsorbable-strong adsorbable copolymer solution droplet on the lyophilic wall. The chain length varies from 10 to 52 with an interval of 6. The polymer concentration is 0.15.
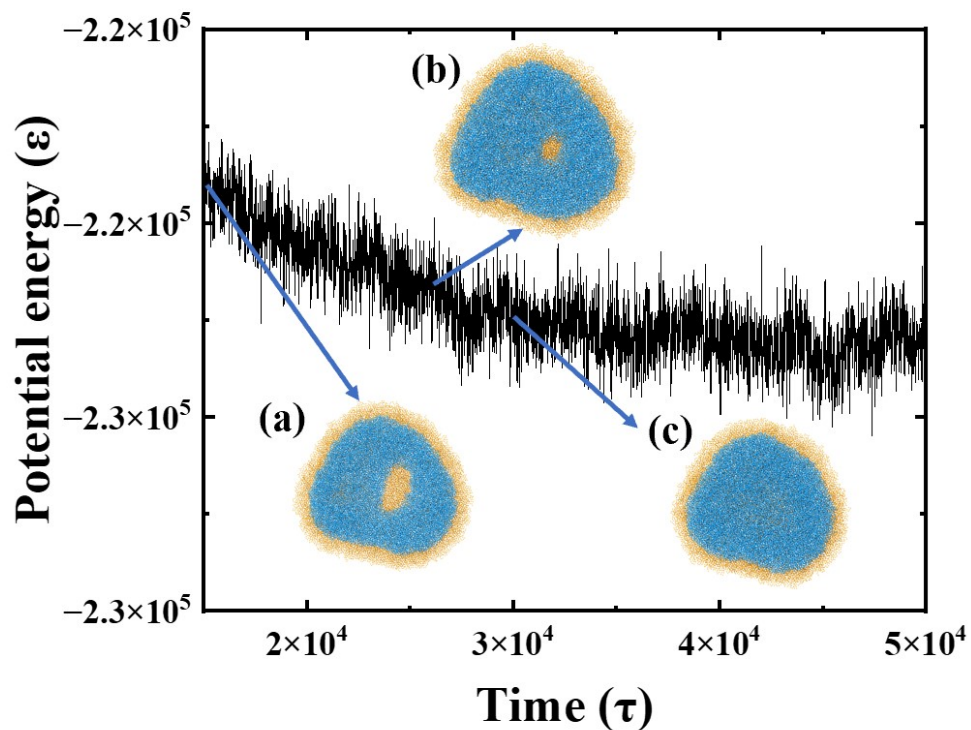

Figure S7. The potential energy of the deposition pattern is plotted with time. Inset snapshots correspond to (a) 15000τ, (b) 25000τ, and (c) 30000τ. The droplet consists of the nonadsorbable-adsorbable copolymer solution on the lyophilic wall. The initial polymer concentration is 0.15 and the chain length is 52. The time starts from the beginning of the evaporation.
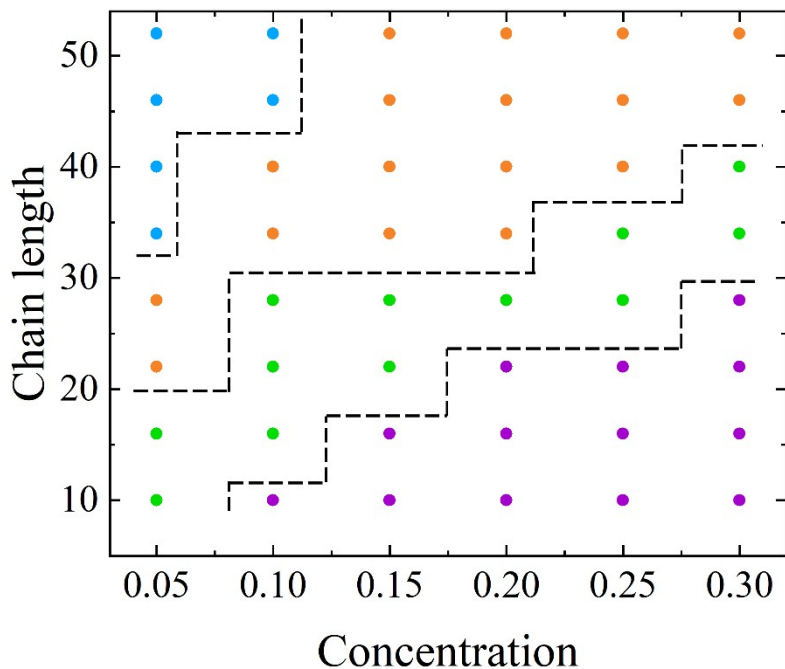
Figure S8. Deposition patterns with various chain lengths and polymer concentrations on the lyophobic wall. All the patterns are the multilayer structure or the structure with defects. The defects can disappear after a long-time relaxation. Blue, orange, green, and purple circles represent two, three, four, and five layers of blocks in the deposition pattern, respectively. The droplet consists of the nonadsorbable-adsorbable copolymer solution.

Table S1. Contact angles and radius of the nonadsorbable-adsorbable and the nonadsorbable-strong adsorbable copolymer solution droplets on the lyophilic and the lyophobic walls before evaporation. The polymer concentration is 0.15 and the chain length is 28.

System	Contact angle (degree)	Radius (σ)
N-A-I	41.0	74.5
N-A-O	88.7	53.6
N-S-I	38.2	79.0
N-S-O	81.6	56.5