

Electronic Supplementary Information

Force-induced Polymerization and Depolymerization of F-actin at Water/Solid Interfaces

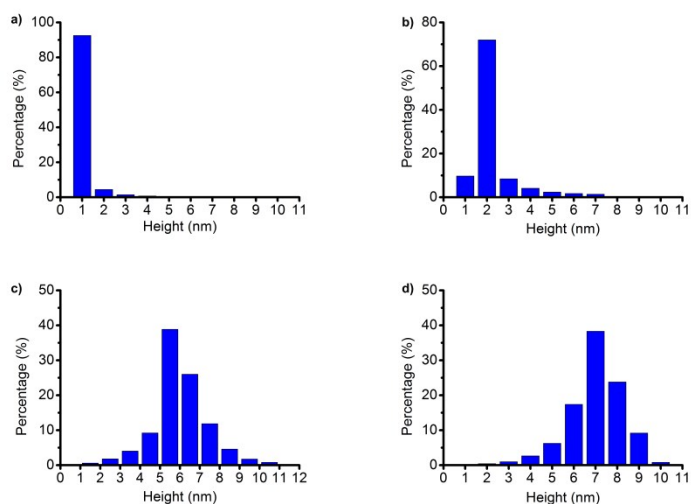
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1. The height histograms of Figures 1b-1e

A height histogram of an AFM image represents the height distribution of each data point. Figure S1 clearly indicates an increase of the percentage of the F-actin with a height of ~ 7 nm along with the increase of AFM scanning time.

Figure S1 a-d) Height histograms of Figures 1b-1e, respectively.

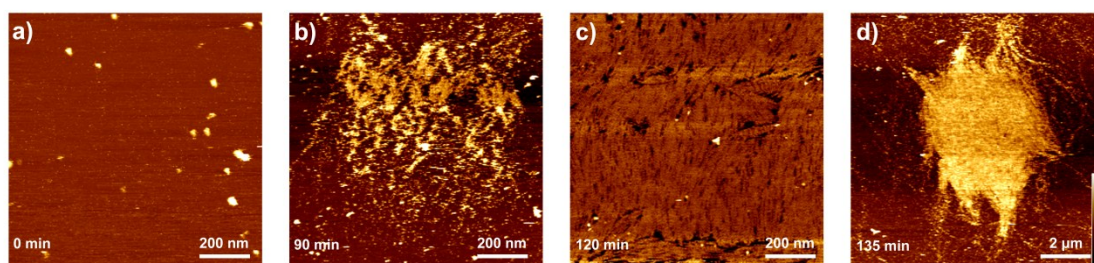


2. F-actin induced by a scanning AFM tip under different concentrations of G-actin

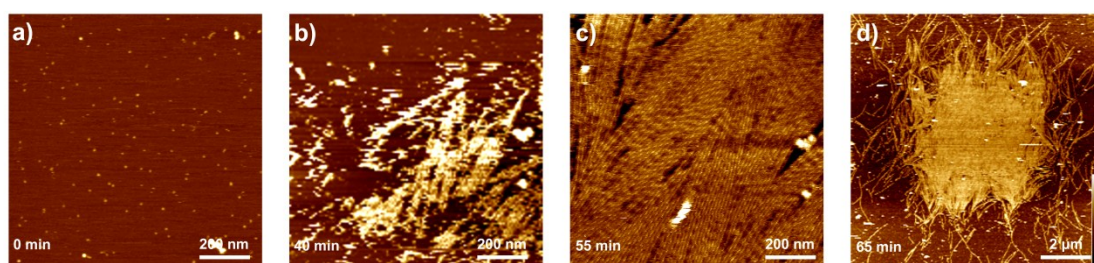
From A-D of Figure S2 it is clear that the lower the G-actin concentration, the longer the scanning time is needed to induce the formation of closely-packed carpet-like F-actin structures.

Figure S2 A series of AFM images depicting the formation of F-actin under a mechanical force of 50 pN exerted by the AFM tip. The Z scale bar in d) represents 0~10 nm and applies to all images.

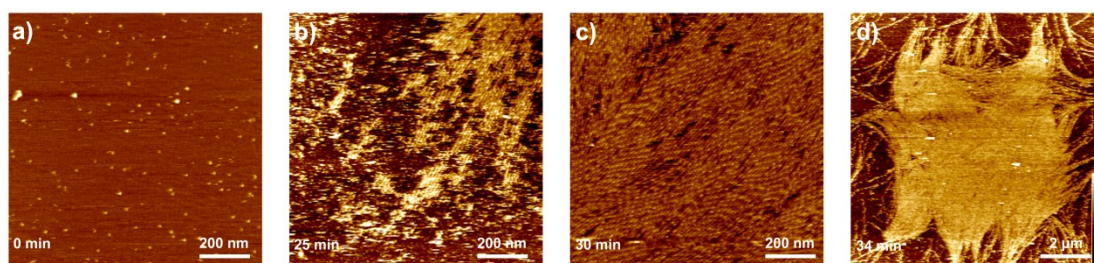
A: [G-actin] = 10 $\mu\text{g/ml}$



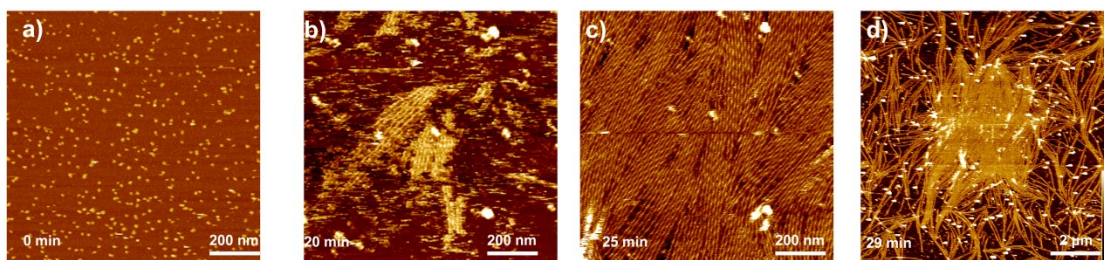
B: [G-actin] = 20 $\mu\text{g/ml}$



C: [G-actin] = 30 $\mu\text{g/ml}$



D: [G-actin] = 40 $\mu\text{g/ml}$



3. The depolymerization of F-actin with different mechanical forces

From Fig. S3 we concluded that under a higher load the F-actin tended to depolymerize faster.

Figure S3 A series of AFM images indicating the depolymerization of F-actin with different mechanical forces. a) At starting point, carpet-like F-actin structure was formed as induced by tapping mode AFM in fluid. b-d) The same area as in a) was raster scanned by the AFM tip with a load of 80 pN for about 20 min (5 scans), which led to the depolymerization of most of the F-actin. e) Carpet-like F-actin structure was formed again after raster scanning the same area by the AFM tip with a load of 50 pN. f) When a load of 120 pN was exerted on the regenerated F-actin, most of it depolymerized after one scan (4 min later). [G-actin] = 40 $\mu\text{g/ml}$. The Z scale bar in f) represents 0~10 nm and applies to all images.

