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Supporting Information

Interplay Between Convective and Viscoelastic Forces Controls the Morphology of *in vitro* Paclitaxel-Stabilized Microtubules

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Received: 26 November 2019; Accepted: 15 January 2020; Published: date

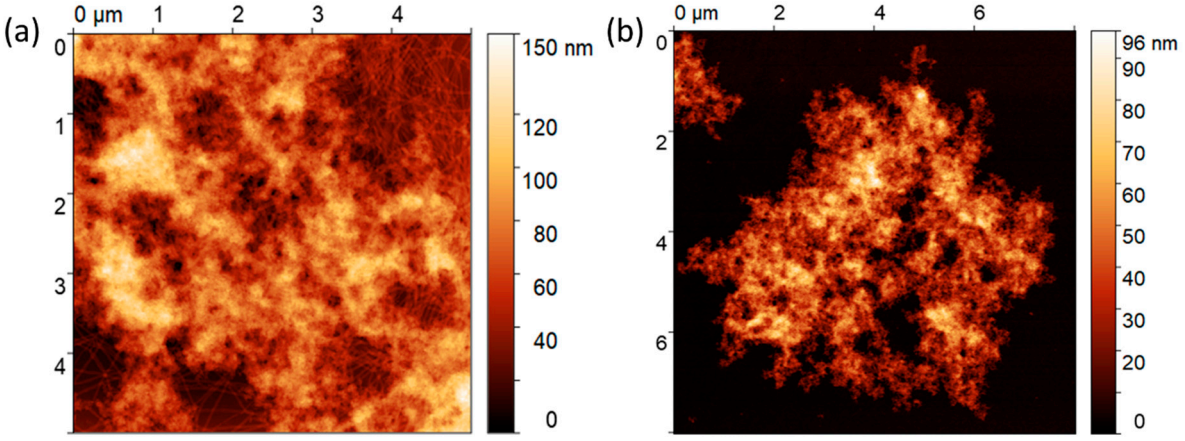

Figure S1. AFM imaging of (**a**) PTX-MTs and (**b**) PTX-free MTs in air on freshly cleaved mica after ~12 h incubation. Tubulin concentration was 5 mg/mL and PTX concentration was 2.5 µM.

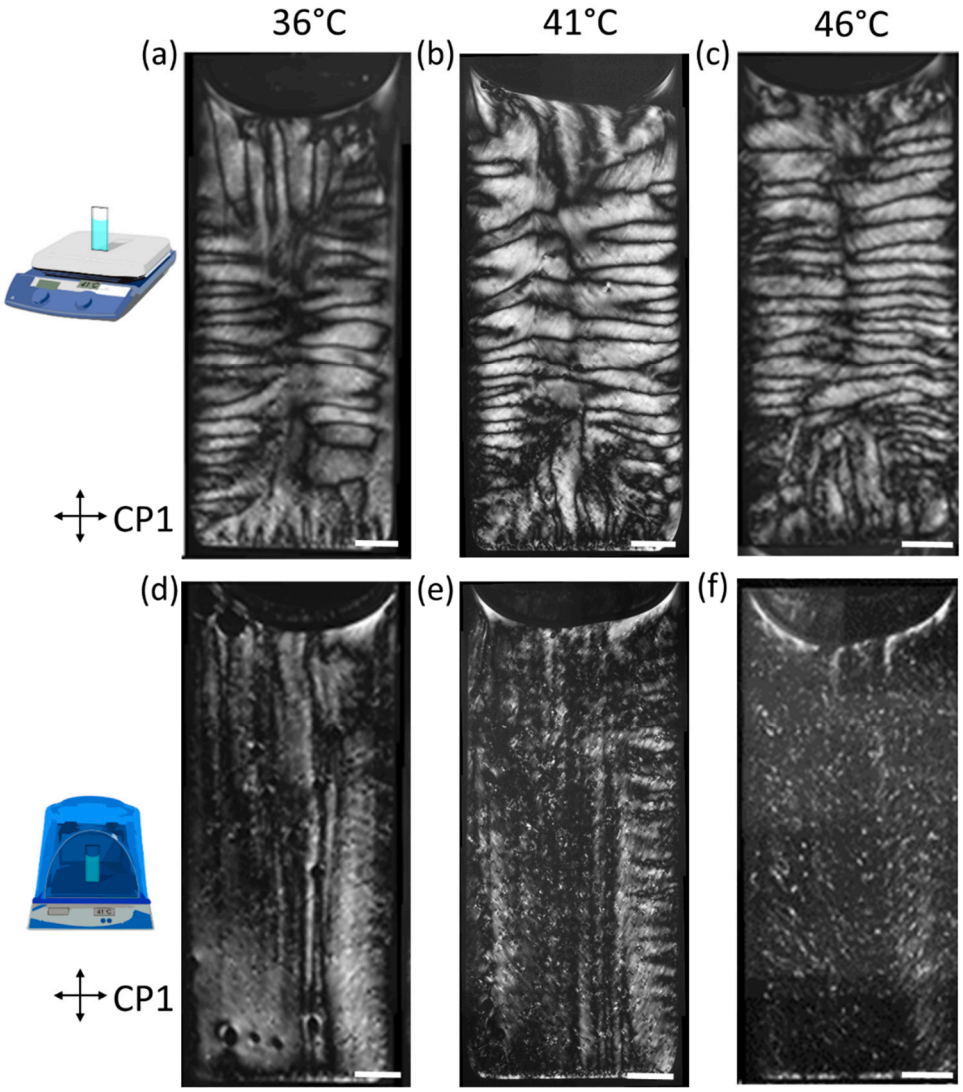

Figure S2. POM images of PTX-MT solutions for hotplate heated PTX-MTs (**a**) 36 °C, (**b**) 41 °C, (**c**) 46 °C and incubator heated PTX-MTs (**d**) 36 °C, (**e**) 41 °C, (**f**) 46 °C at 3.5 h incubation. Tubulin concentration 10 mg/mL, PTX concentration 2.5 μM. Scale bar is 2.5 mm.

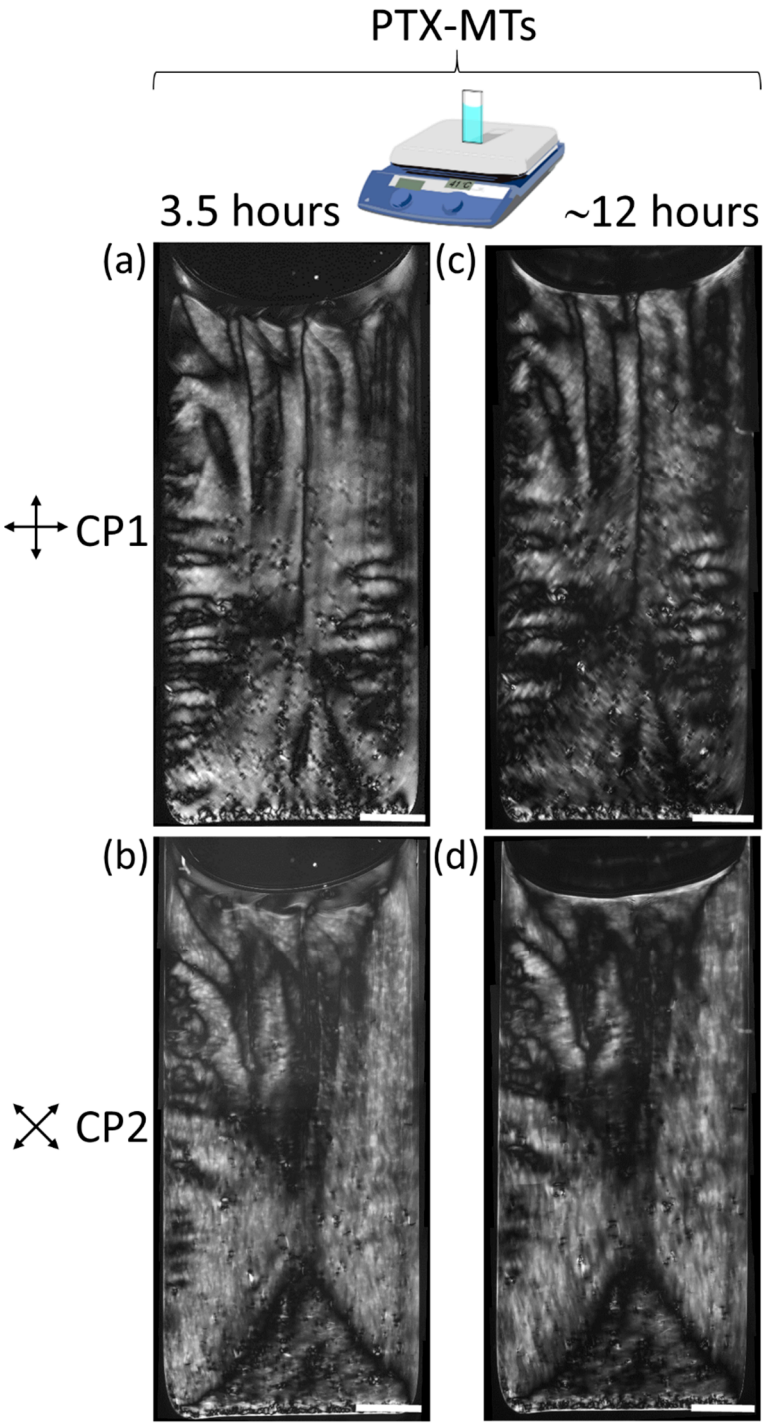

Figure S3. POM images of PTX-MT solutions for hotplate heated PTX-MTs (**a**), (**c**) at 3.5 h and (**b**), (**d**) at ~12 h incubation. Tubulin concentration 10 mg/mL, PTX concentration 2.5 μM. Scale bar is 2.5 mm.

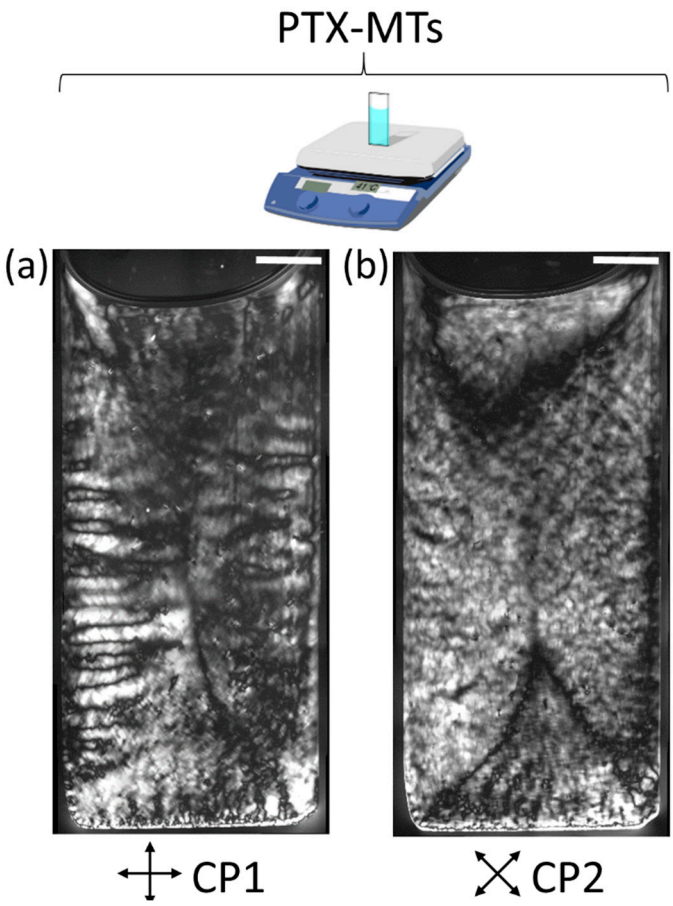

Figure S4. POM images of PTX-MT solution for (**a**) CP1 and (**b**) CP2 configuration, collected at 3.5 h incubation. Tubulin concentration was 5 mg/mL, and PTX concentration was 2.5 μM. Scale bar is 2.5 mm.

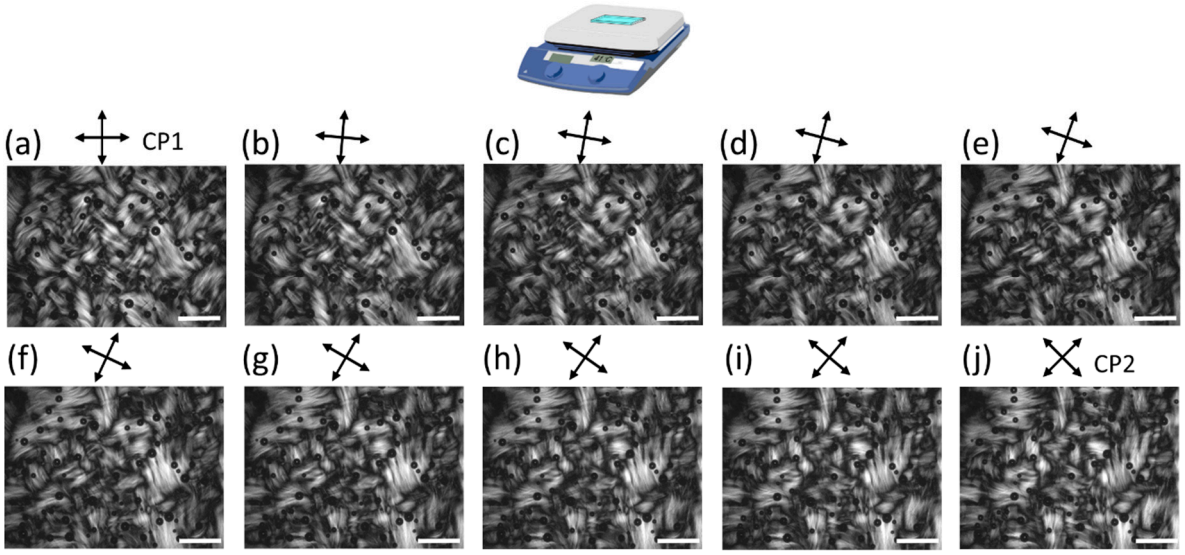

Figure S5. Higher magnification POM images of PTX-MT horizontal hotplate polymerization obtained at 15 min incubation. CPs are rotating from CP1 (**a**) to CP2 (**j**) configuration. Scale bar is 1 mm.

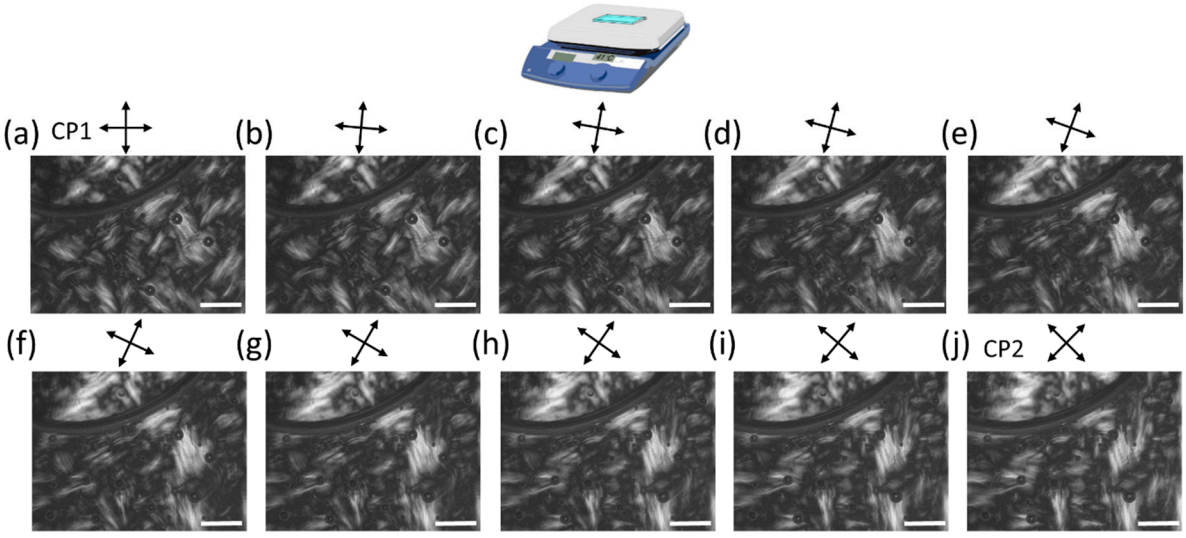

Figure S6. Higher magnification POM images of PTX-MT horizontal hotplate polymerization obtained at ~12 h incubation. CPs are rotating from CP1 (**a**) to CP2 (**j**) configuration. Scale bar is 1 mm.

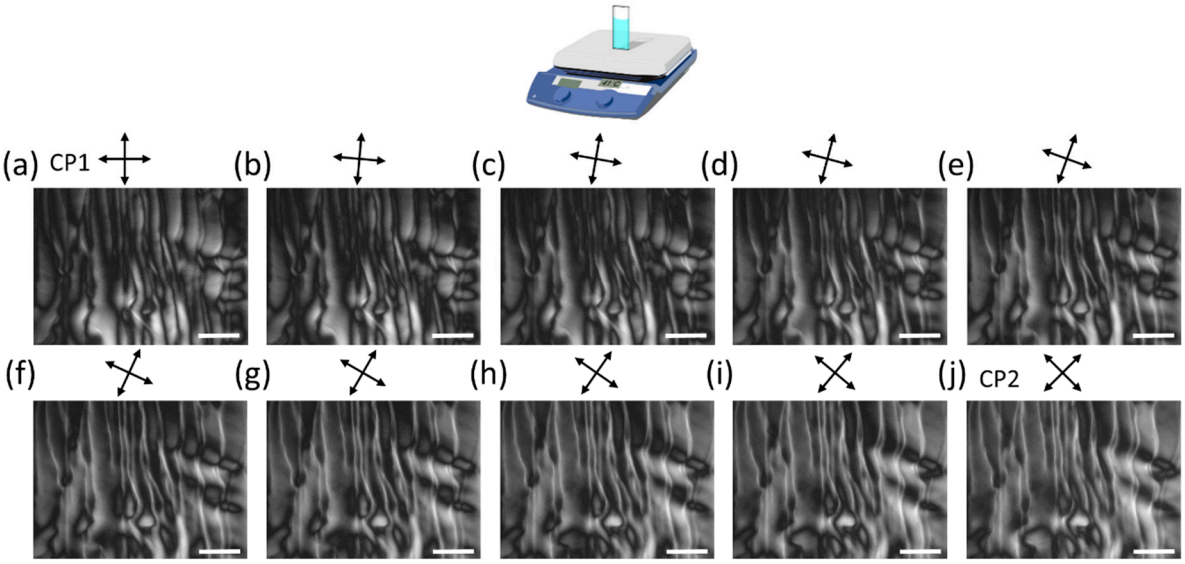

Figure S7. Higher magnification POM images of PTX-MT vertical hotplate polymerization obtained at 15 min incubation. CPs are rotating from CP1 (**a**) to CP2 (**j**) configuration. Scale bar is 1 mm.

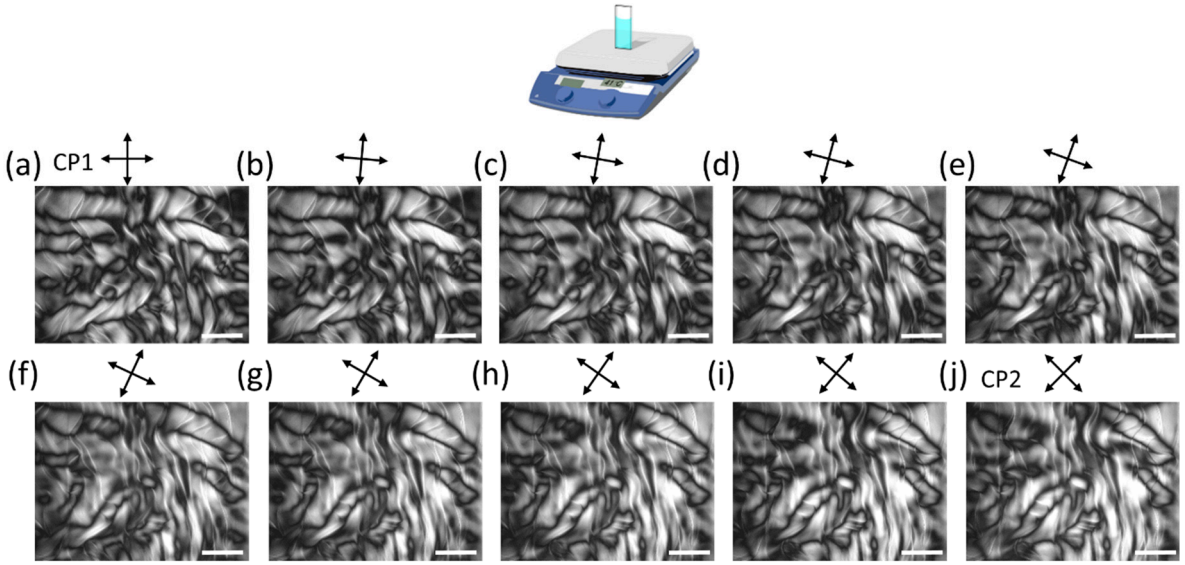

Figure S8. Higher magnification POM images of PTX-MT vertical hotplate polymerization obtained at ~12 h incubation. CPs are rotating from CP1 (**a**) to CP2 (**j**) configuration. Scale bar is 1 mm.

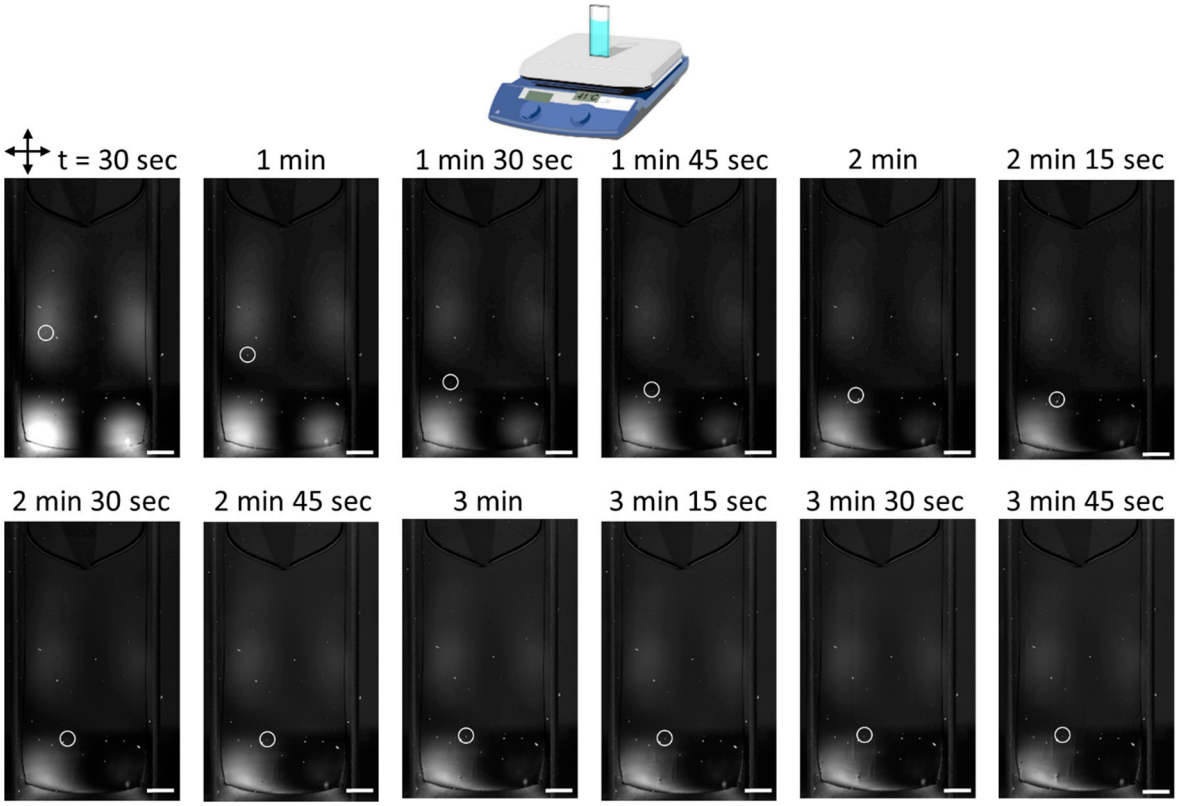

Figure S9. Tracking particle motion in a heated PTX-MT cuvette. Over time particle motion stops due to gelation of solution. Tubulin concentration was 5 mg/mL and PTX concentration was 2.5 μM. Scale bar is 2 mm.

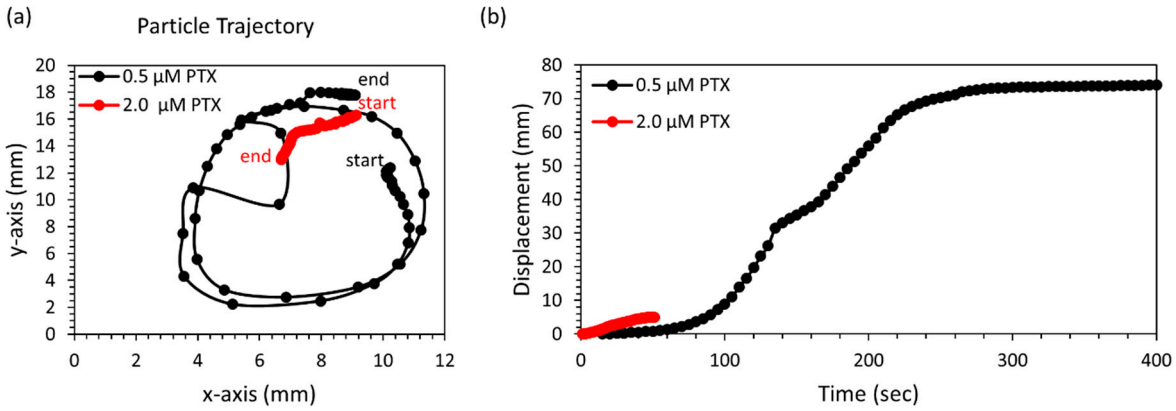

Figure S10. Particle tracking in PTX-MT solutions. (**a**) Particle trajectory and (**b**) particle displacement for the 0.5 µM and 2.0 µM PTX solutions. Cessation of particle motion is indicated by horizontal leveling of the displacement curves.

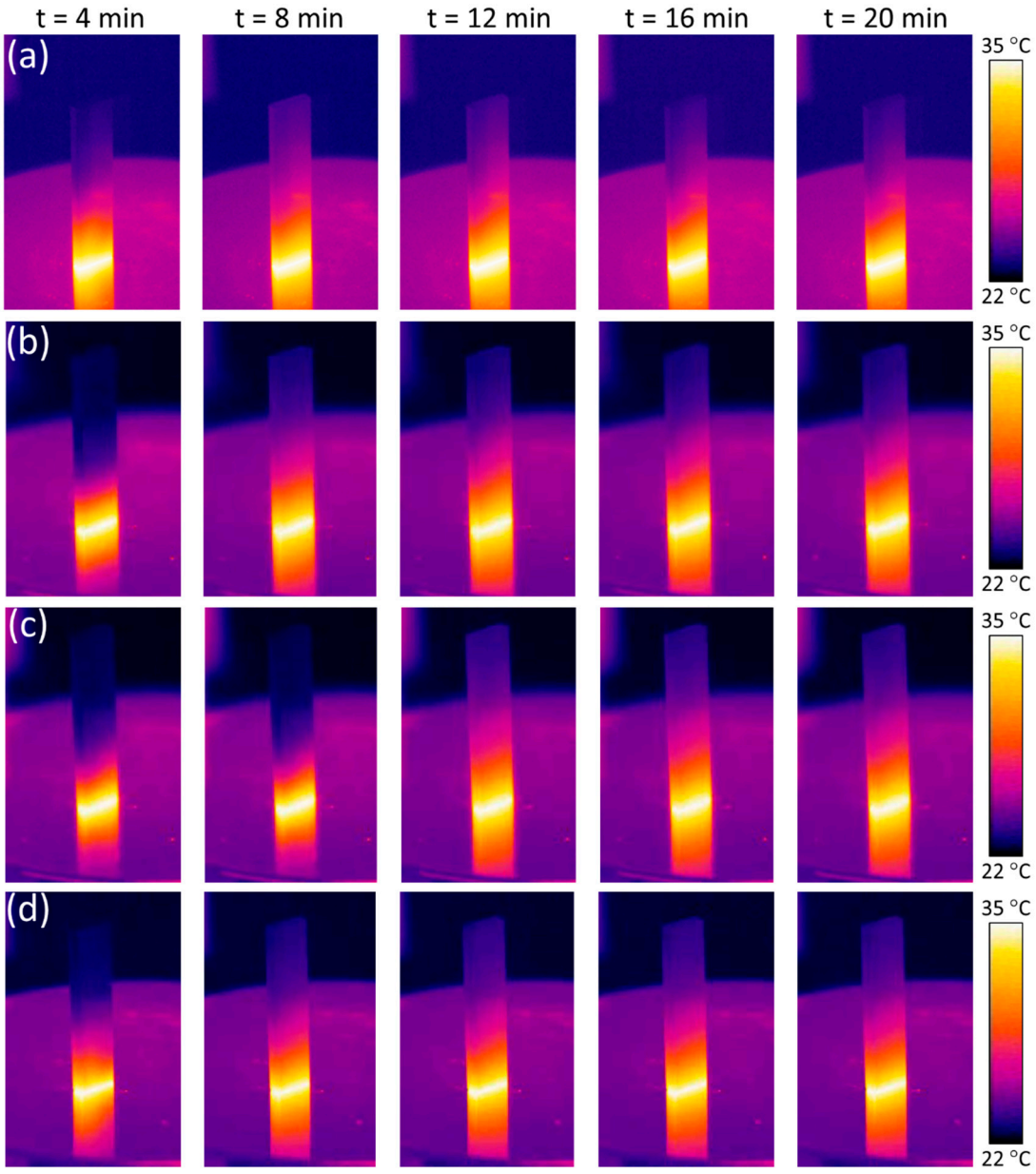

Figure S11. Thermal images of PTX-MT solutions **(**tubulin concentration 5 mg/mL) and PTX concentration was (**a**) 0.5 μM, (**b**) 1.0 μM, (**c**), 2.0 μM and (**d**) 2.5 μM.

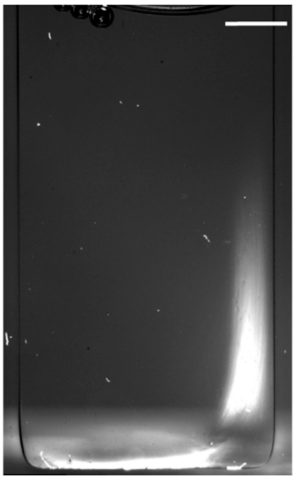

Figure S12. POM image under CP2 configuration showing formation of PTX-MT bundles along the vertical and bottom portion of a vertical cuvette heated on a hotplate. Scale bar is 2.5 mm.

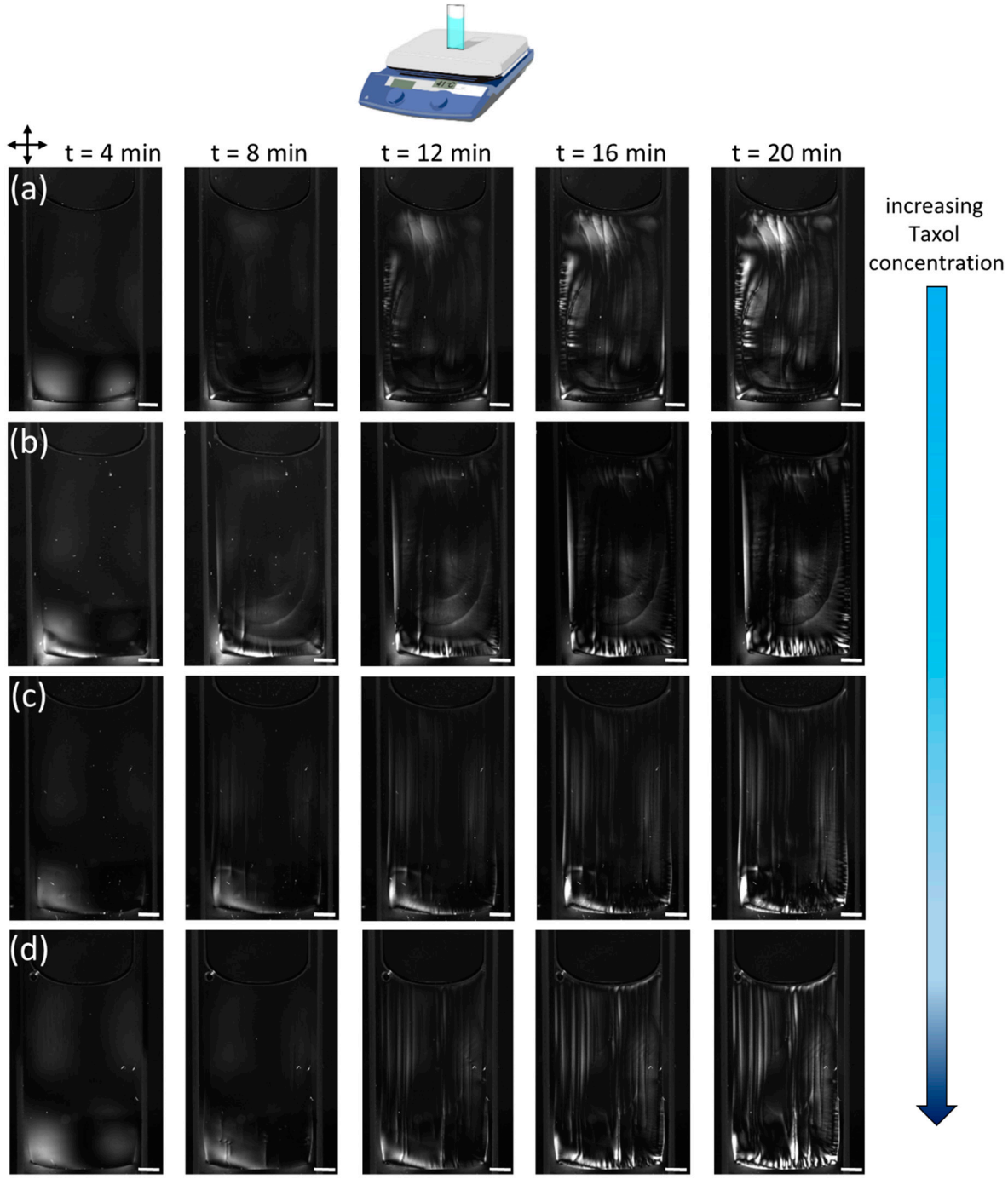

Figure S13. POM images of PTX-MT solutions (tubulin concentration 5 mg/mL) and PTX concentration was (**a**) 0.5 μM, (**b**) 1.0 μM, (**c**), 2.0 μM and (**d**) 2.5 μM. Scale bar is 2 mm.

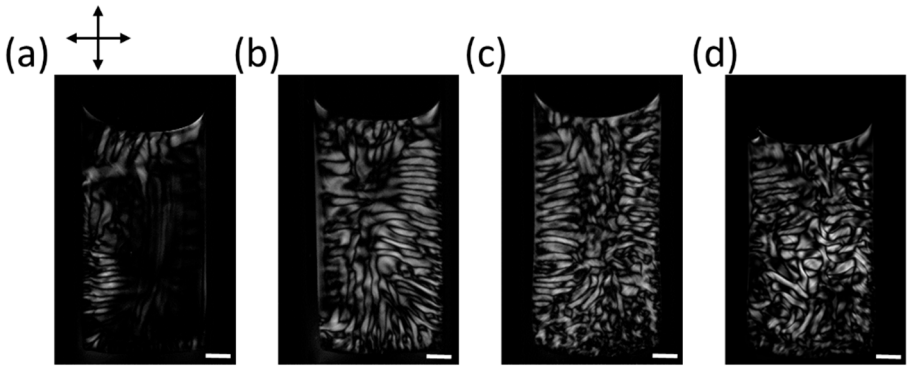

Figure S14. POM images of PTX-MT solutions under CP1 configuration obtained at 240 min incubation. Tubulin concentration was 5 mg/mL and PTX concentration was (**a**) 0.5 μM, (**b**) 1.0 μM, (**c**), 2.0 μM and (**d**) 2.5 μM**.** Scale bar is 2 mm.

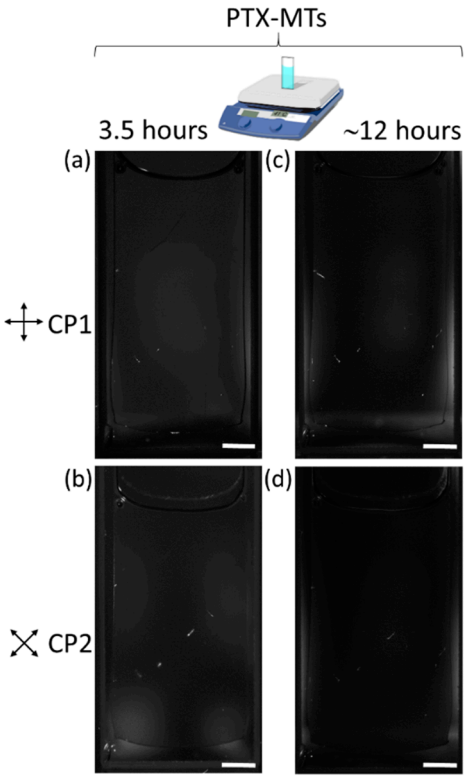

Figure S15. POM images of PTX-MT solutions (tubulin concentration 5 mg/mL) and 5 nM PTX dissolved in water. (**a**) CP1 (**b**) CP2 configuration for a 3.5 hour incubation. (**c**), CP1, (**d**) CP2 configuration ~12 hour incubation. Scale bar is 2.5 mm.

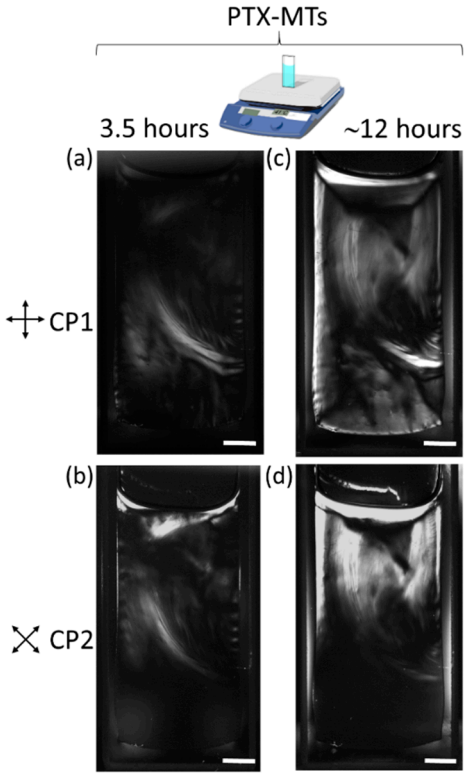

Figure S16. POM images of PTX-MT solutions (tubulin concentration 5 mg/mL) and 5 nM PTX dissolved in DMSO. (**a**) CP1 (**b**) CP2 configuration for a 3.5 hour incubation. (**c**), CP1, (**d**) CP2 configuration ~12 hour incubation. Scale bar is 2.5 mm.

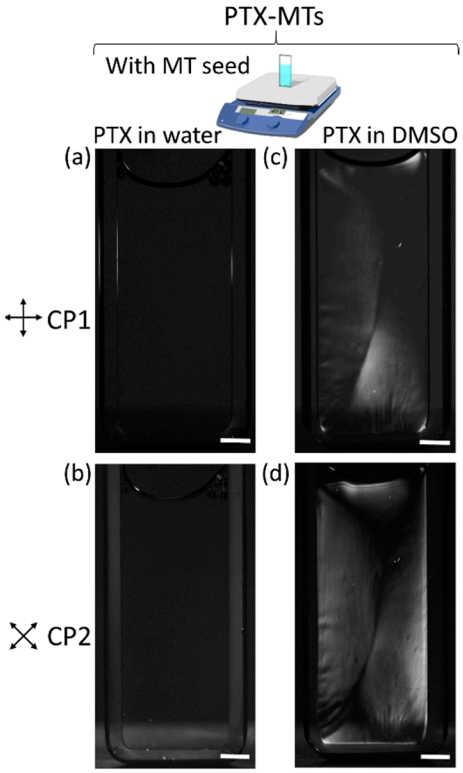

Figure S17. POM images of MT seeded PTX-MT solutions (tubulin concentration 5 mg/mL, 5 nM PTX). PTX dissolved in water (**a**) CP1 (**b**) CP2 configuration; PTX dissolved in DMSO (**c**) CP1 (**d**) CP2 configuration for a 3.5 hour incubation. Scale bar is 2.5 mm.

Video S1. PTX-MT polymerization for horizontal hotplate 15 min incubation. CPs rotate from CP1 to CP2 configuration. Tubulin concentration was 10 mg/mL and PTX concentration was 2.5 μM.

Video S2. PTX-MT polymerization for horizontal hotplate 3.5 h incubation. CPs rotate from CP1 to CP2 configuration. Tubulin concentration was 10 mg/mL and PTX concentration was 2.5 μM.

Video S3. PTX-MT polymerization for horizontal hotplate ~12 h incubation. CPs rotate from CP1 to CP2 configuration. Tubulin concentration was 10 mg/mL and PTX concentration was 2.5 μM.

Video S4. PTX-MT polymerization for vertical hotplate 15 min incubation. CPs rotate from CP1 to CP2 configuration. Tubulin concentration was 10 mg/mL and PTX concentration was 2.5 μM.

Video S5. PTX-MT polymerization for vertical hotplate 3.5 h incubation. CPs rotate from CP1 to CP2 configuration. Tubulin concentration was 10 mg/mL and PTX concentration was 2.5 μM.

Video S6. PTX-MT polymerization for vertical hotplate ~12 h incubation. CPs rotate from CP1 to CP2 configuration. Tubulin concentration was 10 mg/mL and PTX concentration was 2.5 μM.

Video S7. Time-dependent POM images of MT solution for vertical hotplate incubation. Tubulin concentration was 5 mg/m. Two minute time step between frames.

Video S8. Time-dependent POM images of MT-PTX solution for vertical hotplate incubation. Tubulin concentration was 5 mg/m and PTX concentration was 0.5 μM. Two minute time step between frames.

Video S9. Time-dependent POM images of MT-PTX solution for vertical hotplate incubation. Tubulin concentration was 5 mg/m and PTX concentration was 1.0 μM. Two minute time step between frames.

Video S10. Time-dependent POM images of MT-PTX solution for vertical hotplate incubation. Tubulin concentration was 5 mg/m and PTX concentration was 2.0 μM. Two minute time step between frames.

Video S11. Time-dependent POM images of MT-PTX solution for vertical hotplate incubation. Tubulin concentration was 5 mg/m and PTX concentration was 2.5 μM. Two minute time step between frames.

Video S12. Time-dependent thermal imaging of MT-PTX solution for vertical hotplate incubation. Tubulin concentration was 5 mg/m and PTX concentration was 0.5 μM. Two minute time step between frames.

Video S13. Time-dependent thermal imaging of MT-PTX solution for vertical hotplate incubation. Tubulin concentration was 5 mg/m and PTX concentration was 2.5 μM. Two minute time step between frames.