SUPPORTING INFORMATION for

Mechanical coupling limits the density and quality of self-organized carbon nanotube growth

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RECEIVED DATE (to be automatically inserted after your manuscript is accepted if required according to the journal that you are submitting your paper to)

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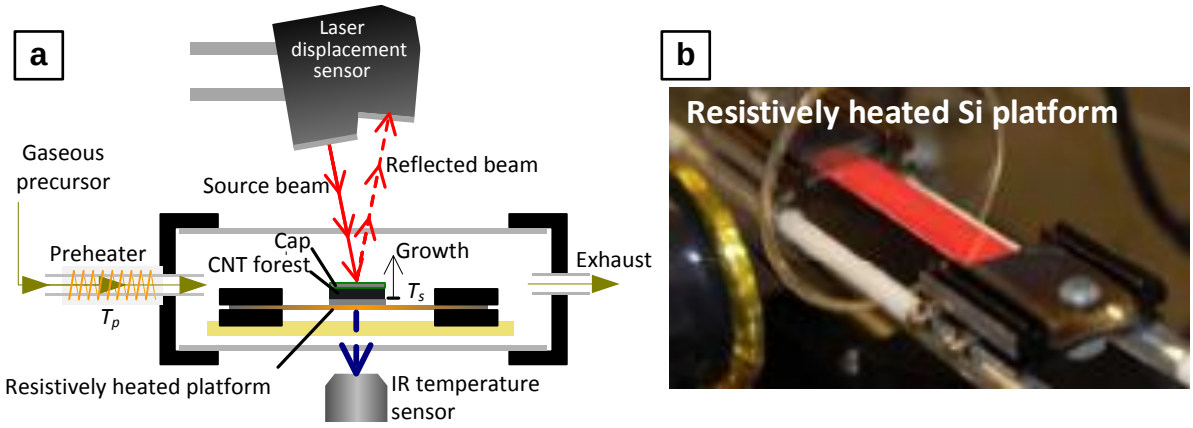

Fig. S1. Schematic of the cold-walled reactor used to grow CNTs in this study by atmospheric pressure catalytic CVD, along with a photograph of the resistively heated platform (shown heated in air with the tube retracted).

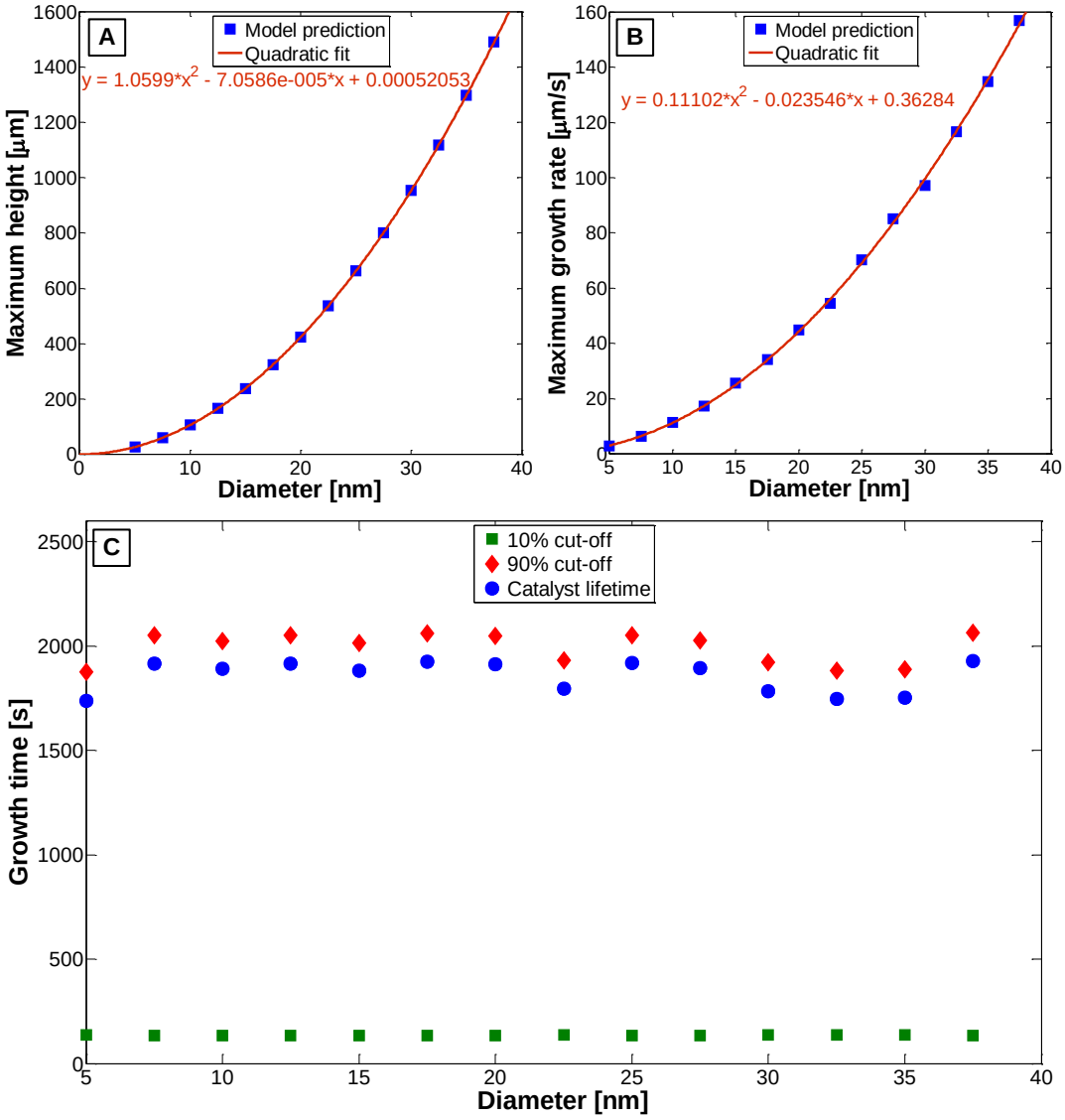

Fig. S2. Results from the mathematical model developed by Puretzky *et al.** for CNT growth from Fe nanoparticles using 0.5 sccm C_2H_2 as the hydrocarbon precursor at 1000 K. Diameter-dependent change in maximum height (A), growth rate (B), and lifetime (C).

*Puretzky, A. A.; Geohegan, D. B.; Jesse, S.; Ivanov, I. N.; Eres, G., In situ measurements and modeling of carbon nanotube array growth kinetics during chemical vapor deposition. *Applied Physics A - Materials Science & Processing* 2005, 81, 223-240.

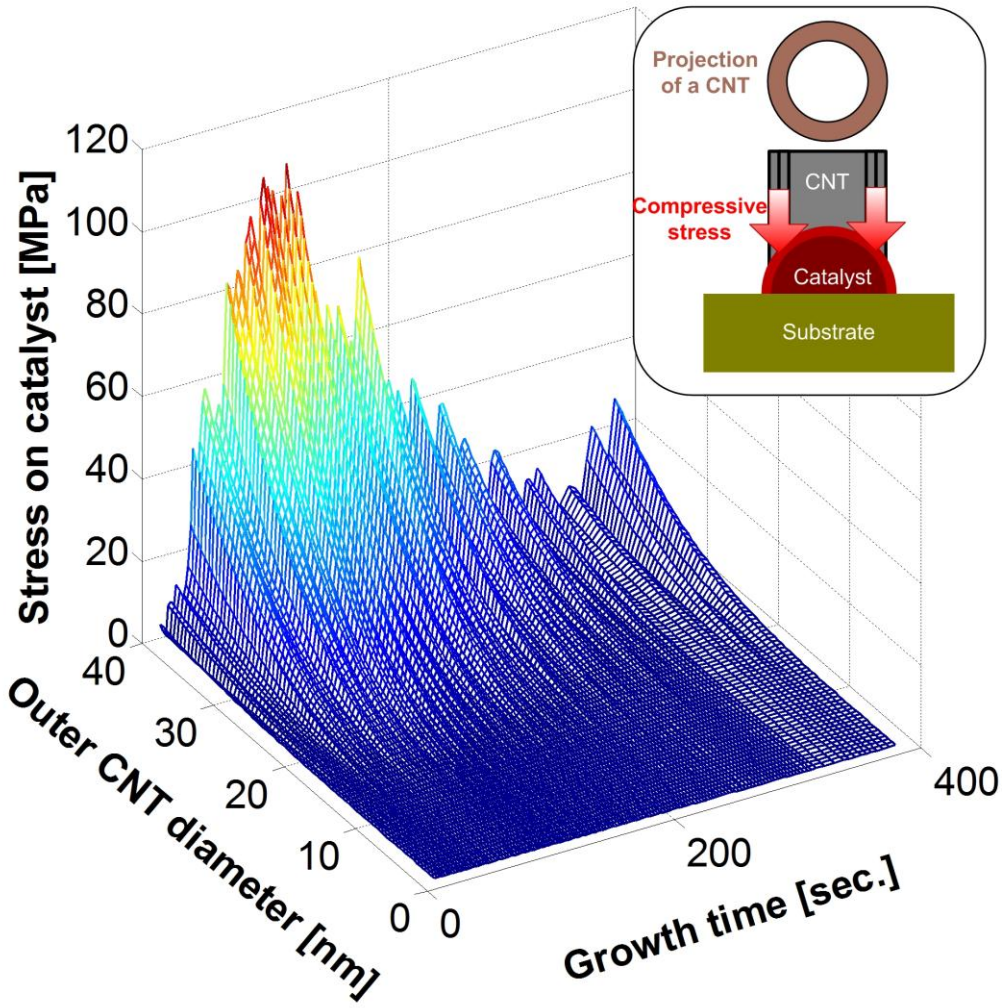

Fig. S3. The time evolution of compressive stresses on the catalyst nanoparticles as a function of diameter , relative to the collective forest growth rate. Here, the stress is calculated by dividing the force by the projected area of a CNT considering their outer and inner diameters calculated based on fitting the SAXS linescans.

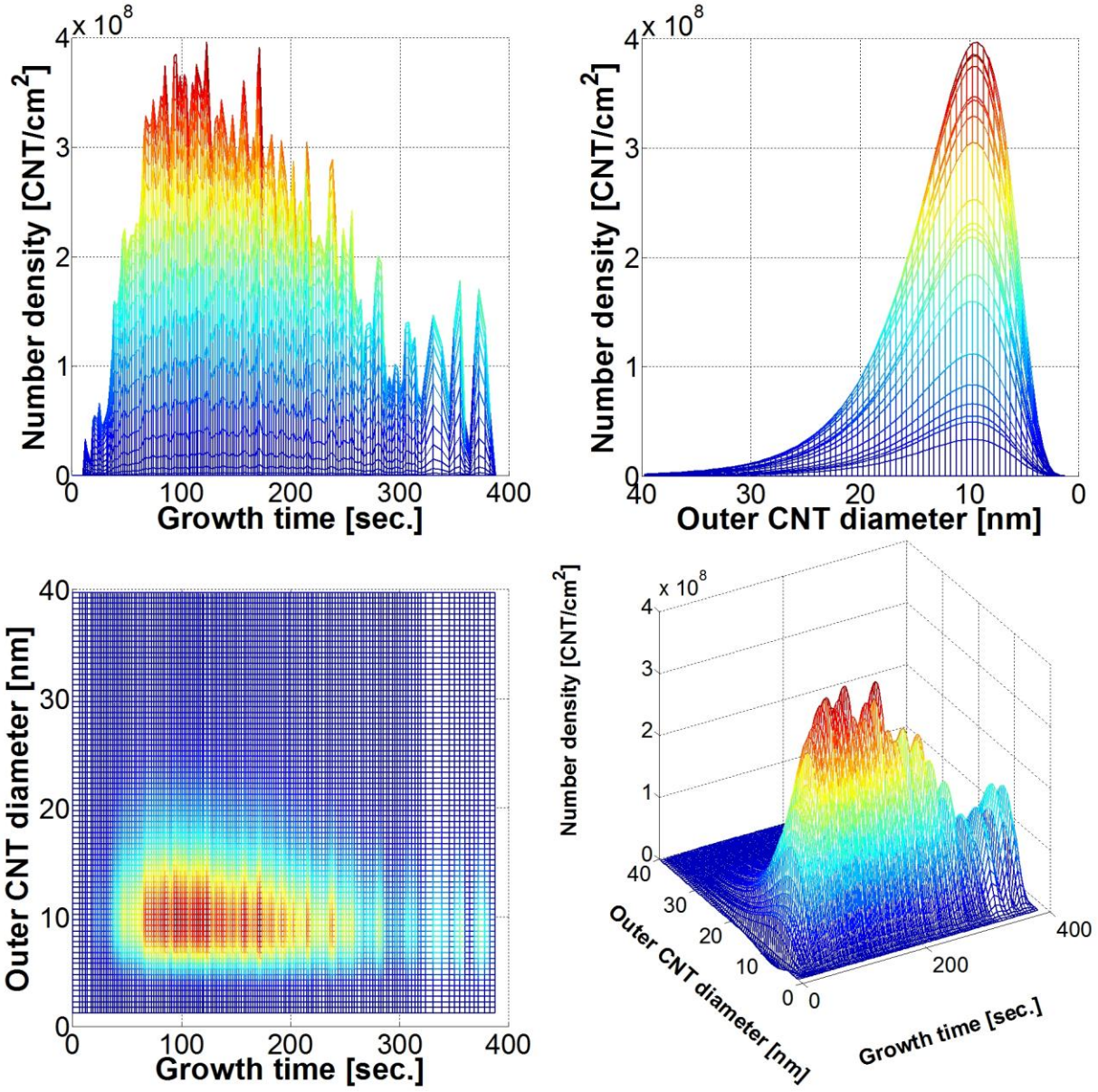

Fig. S4. The time evolution of the diameter-dependent variation in CNT number density per unit area.

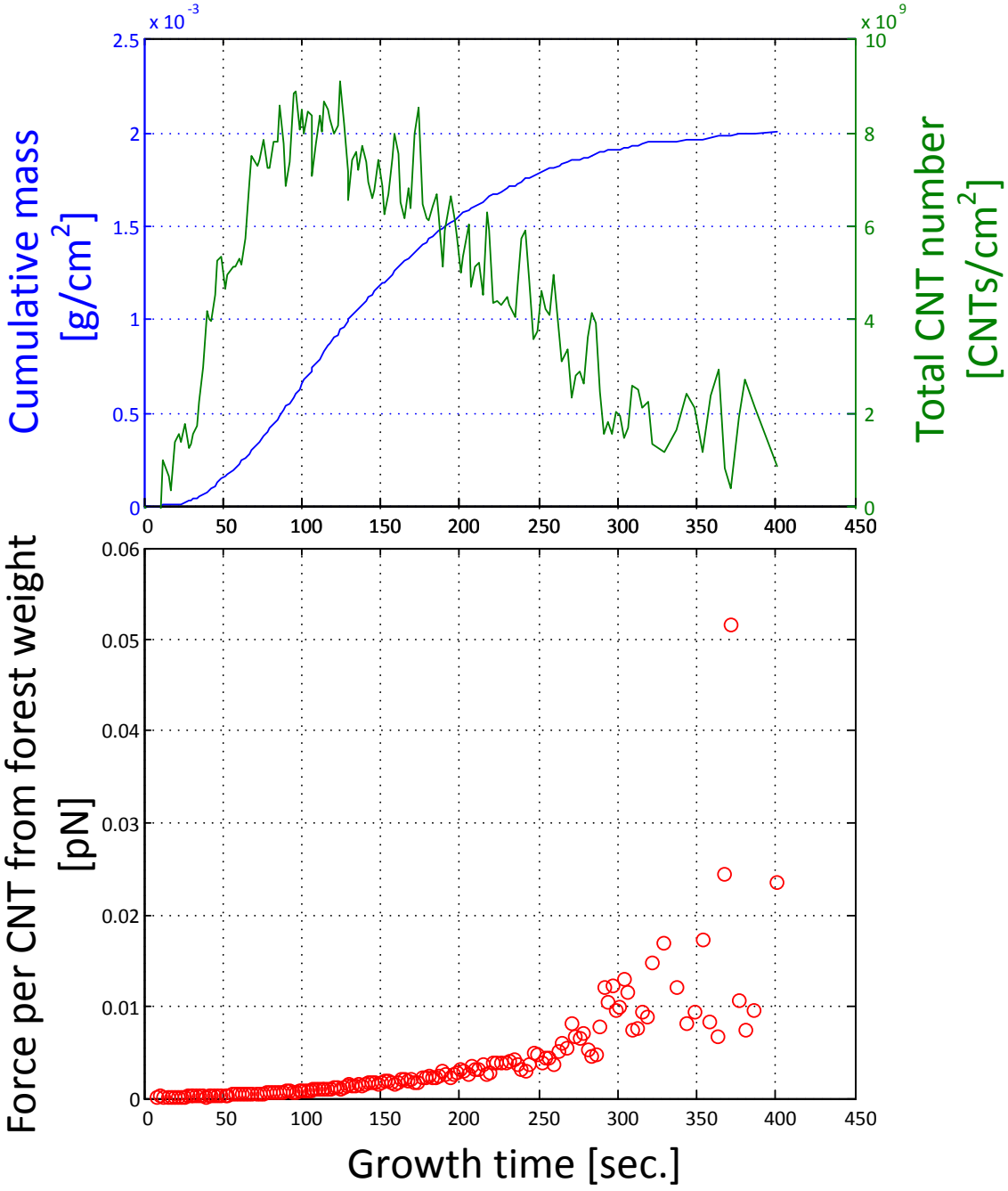

Fig. S5. (A) Time evolution if the cumulative forest mass and total CNT number density. (B) Force per CNT from forest weight calculated by dividing the blue curve by the green curve.