

Flow Imaging Microscopy-based Method for Rapid, High-throughput Measurement of Fiber Count and Length Distributions in Air

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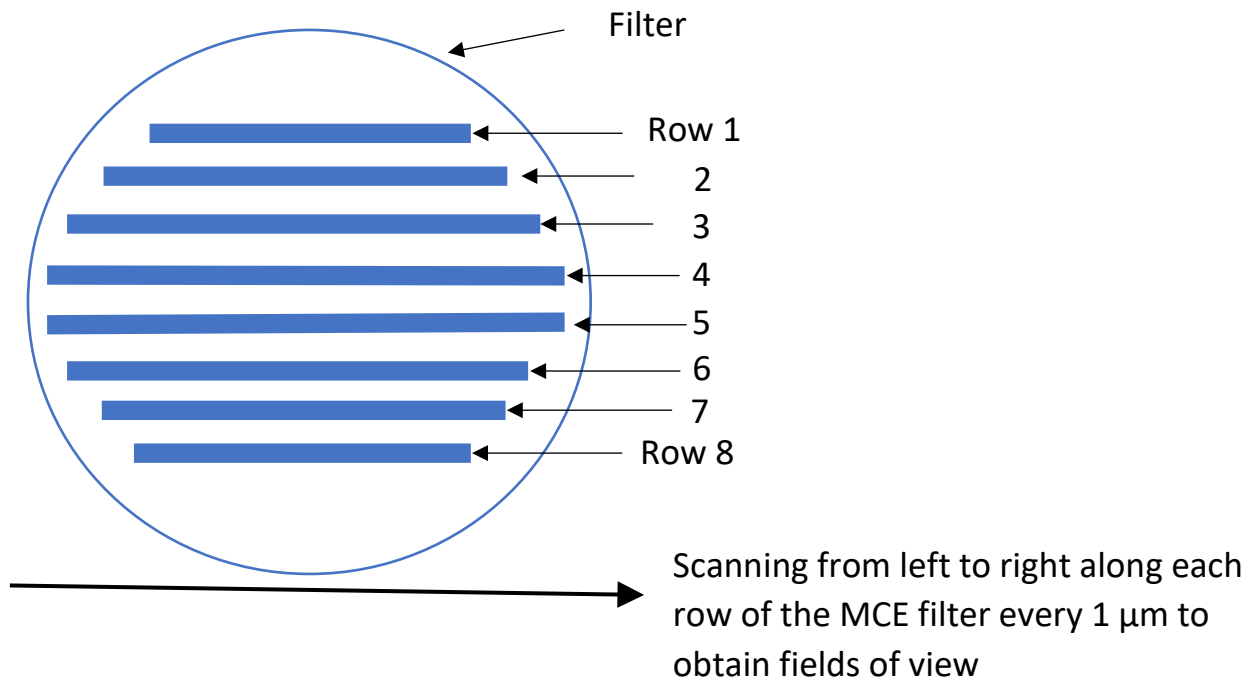


Fig. S1 (a) Schematic diagram of the field of view scanned on a filter where fibers were counted by PCM. Fiber density as a function of fiber count based on PCM and FIM methods was obtained from each row. The average fiber density for each row was calculated as fibers in scanned fields of view were counted.

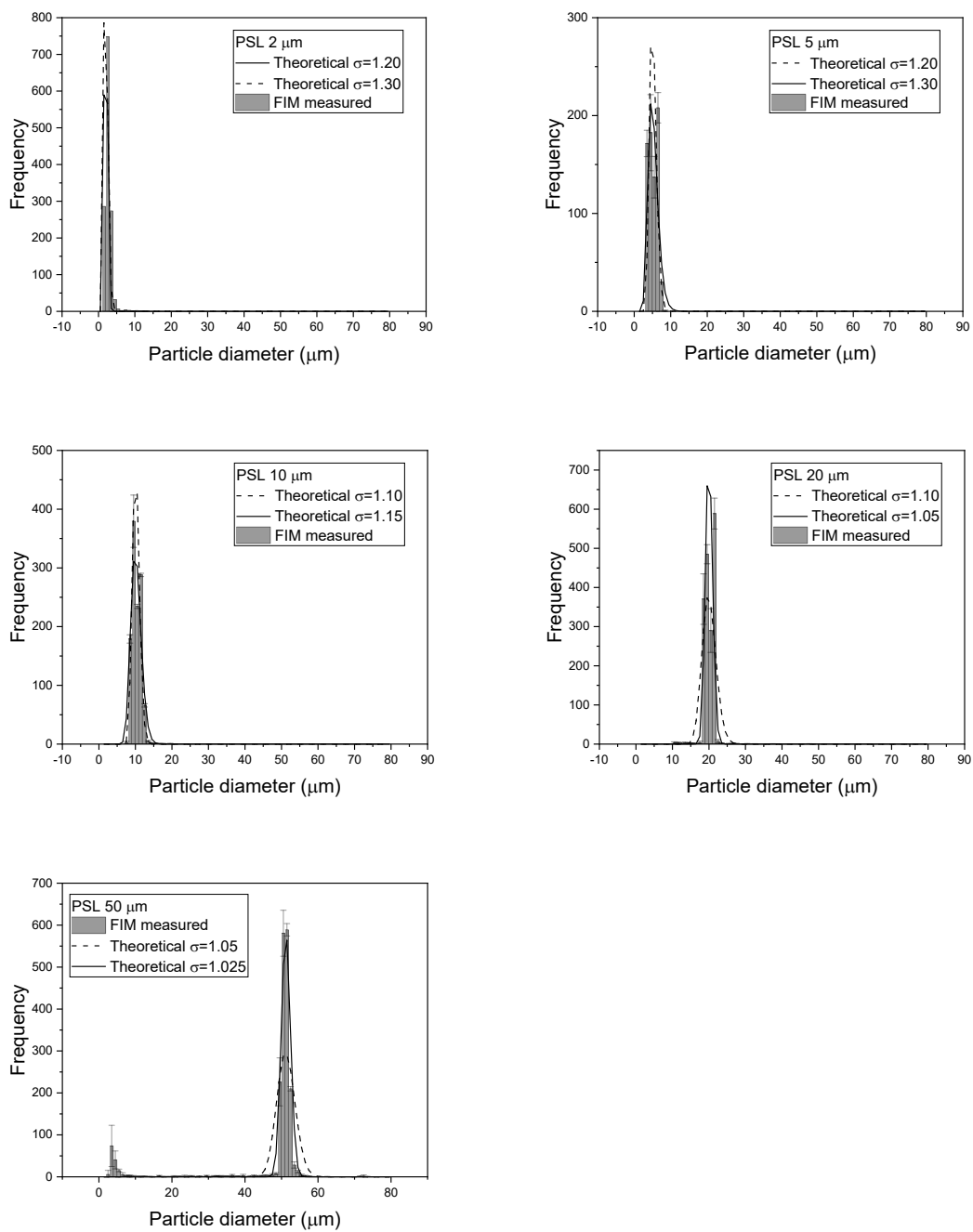


Fig. S2 Comparison of particle size distributions of PSL microspheres (monodisperse particles and mixtures) in the diameter range possible (2 μm- 50μm) by FIM with 10X magnification and theoretical size distributions.

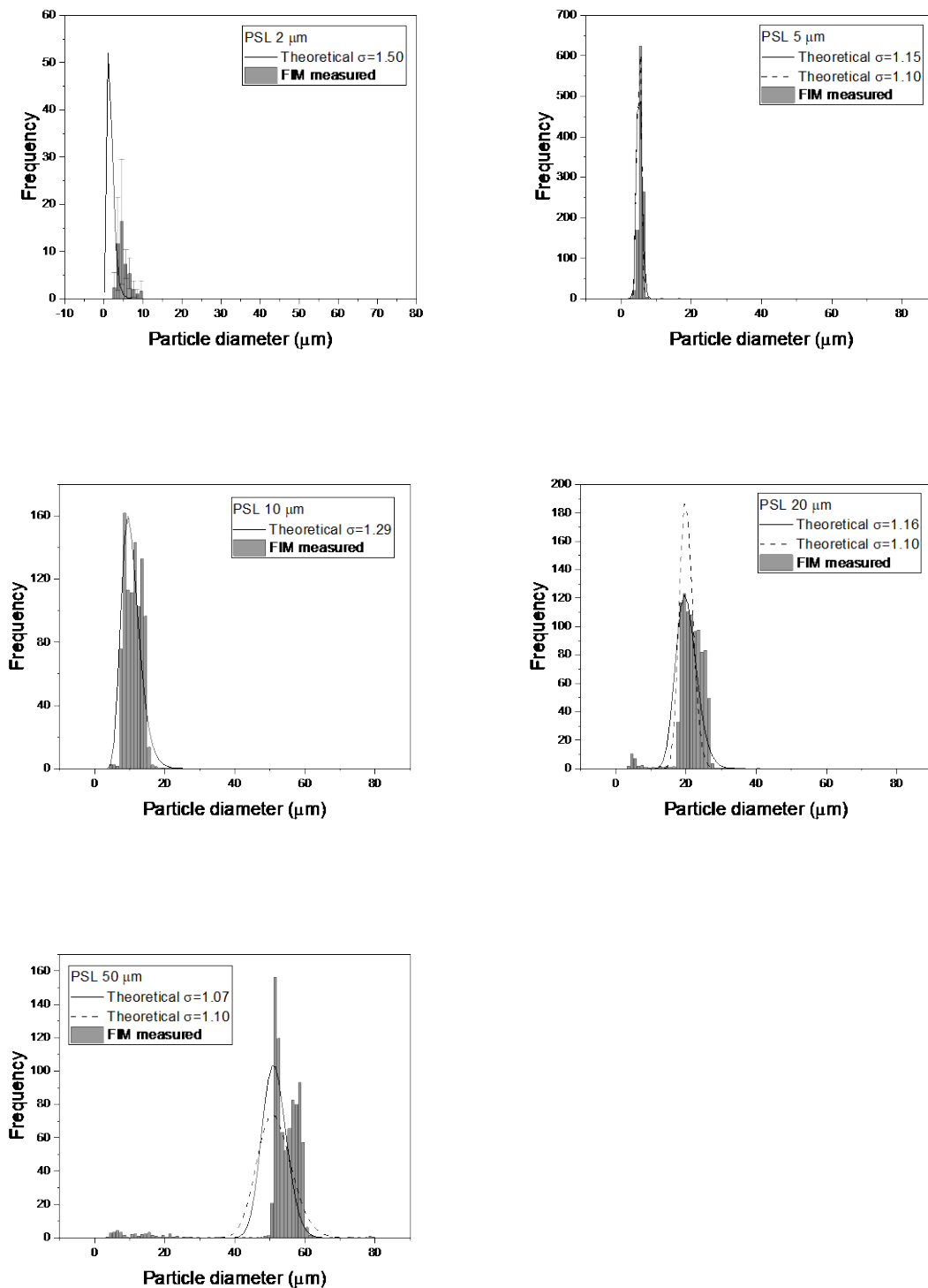


Fig. S3 Comparison of particle size distributions of PSL microspheres (monodisperse particles and mixtures) in the diameter range possible (2 μm- 50μm) by FIM with 4X magnification and theoretical size distributions.

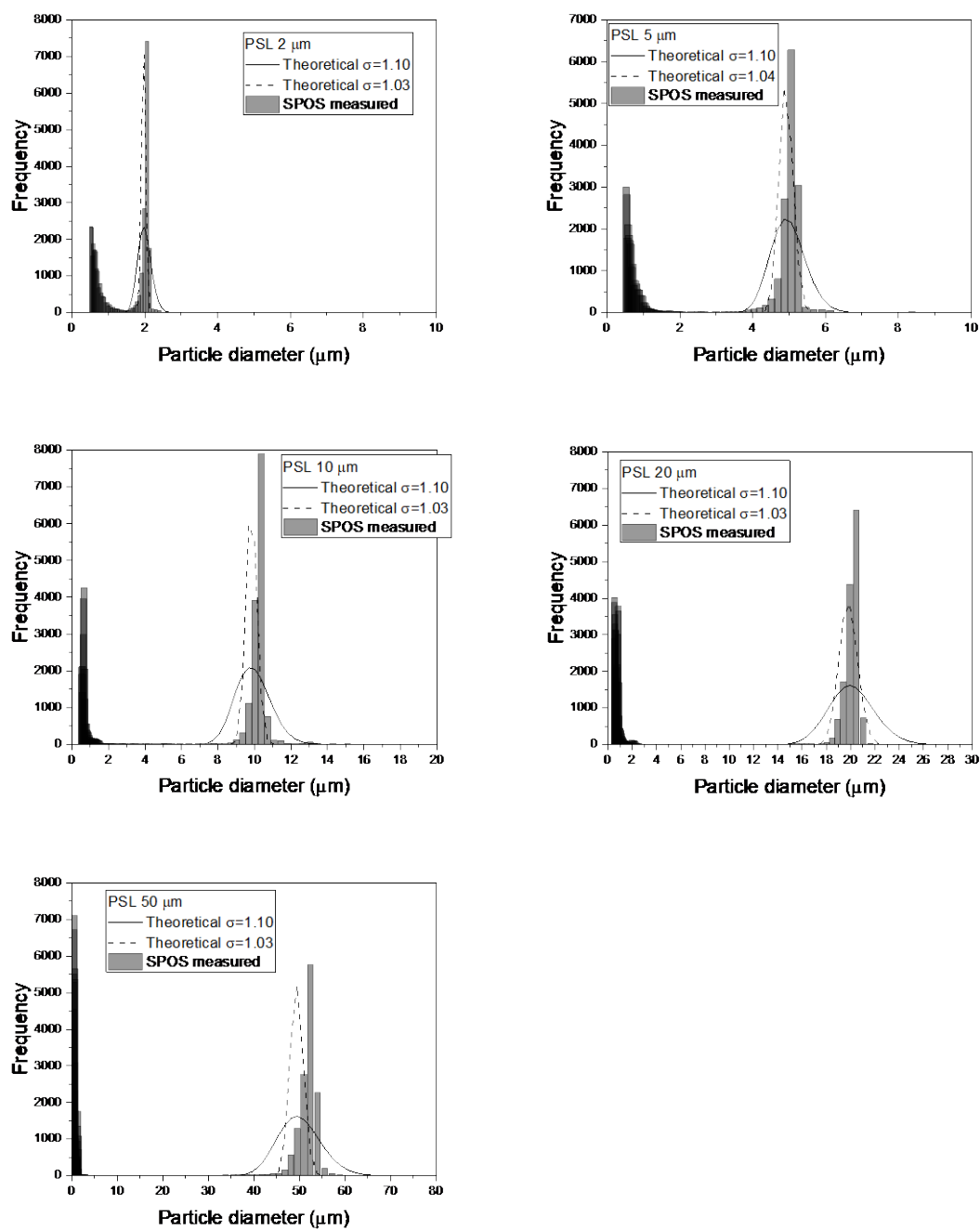


Fig. S4 Comparison of particle size distributions of PSL microspheres (monodisperse particles) in the diameter range possible (2 μm- 50μm) by SPOS and theoretical size distributions.

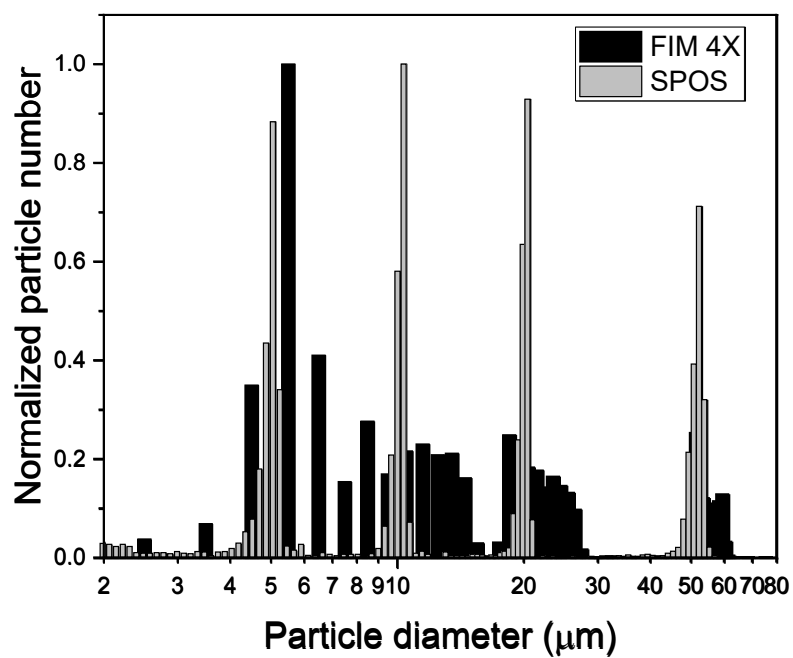
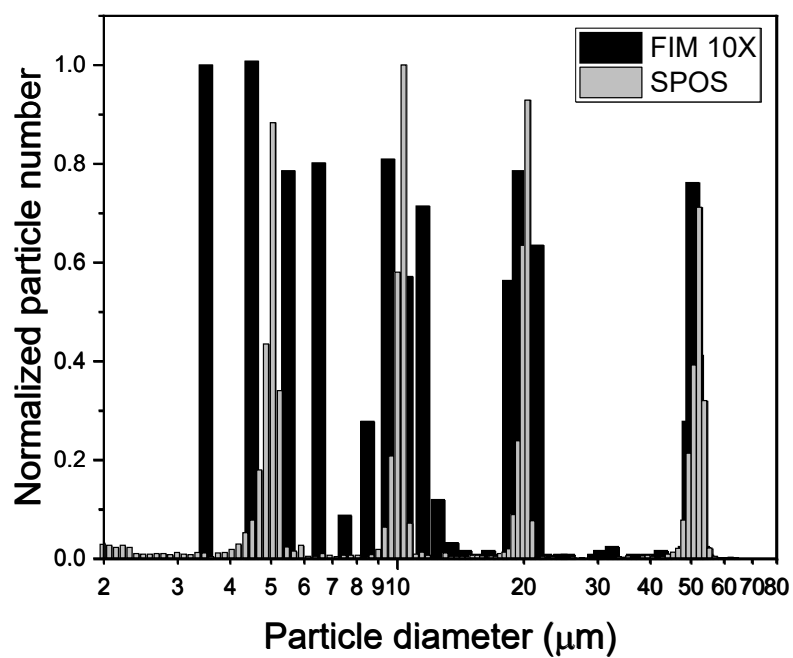
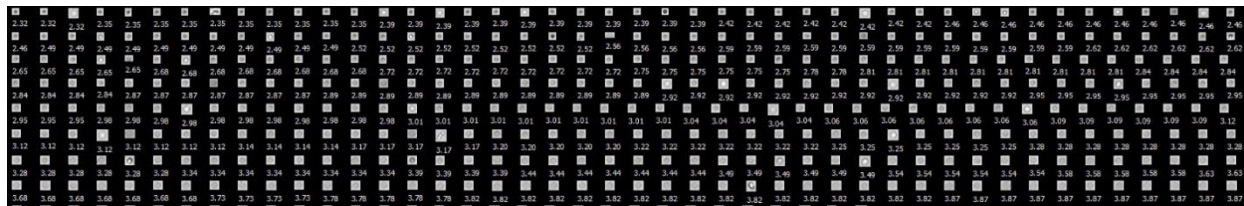
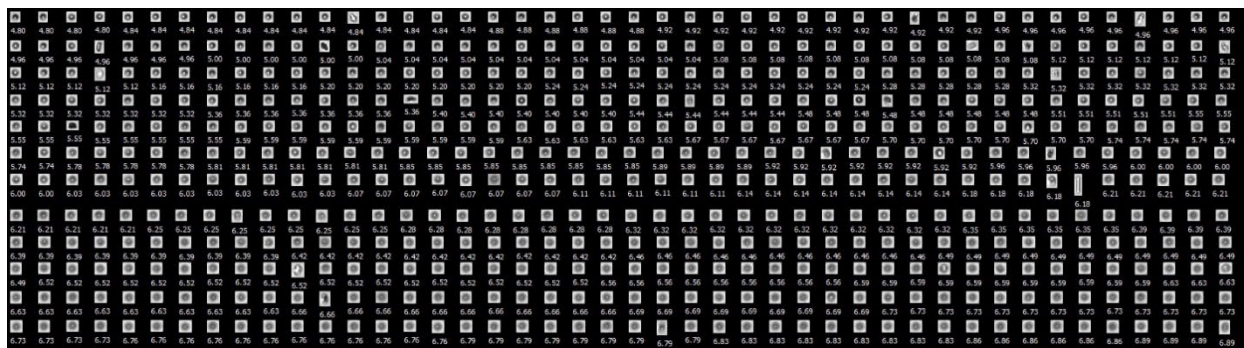


Fig. S5 Comparison of particle size distributions of PSL microspheres (mixtures of monodisperse particles) in the diameter range possible (5 μm - 50 μm) by SPOS, FIM 4X and FIM 10X.

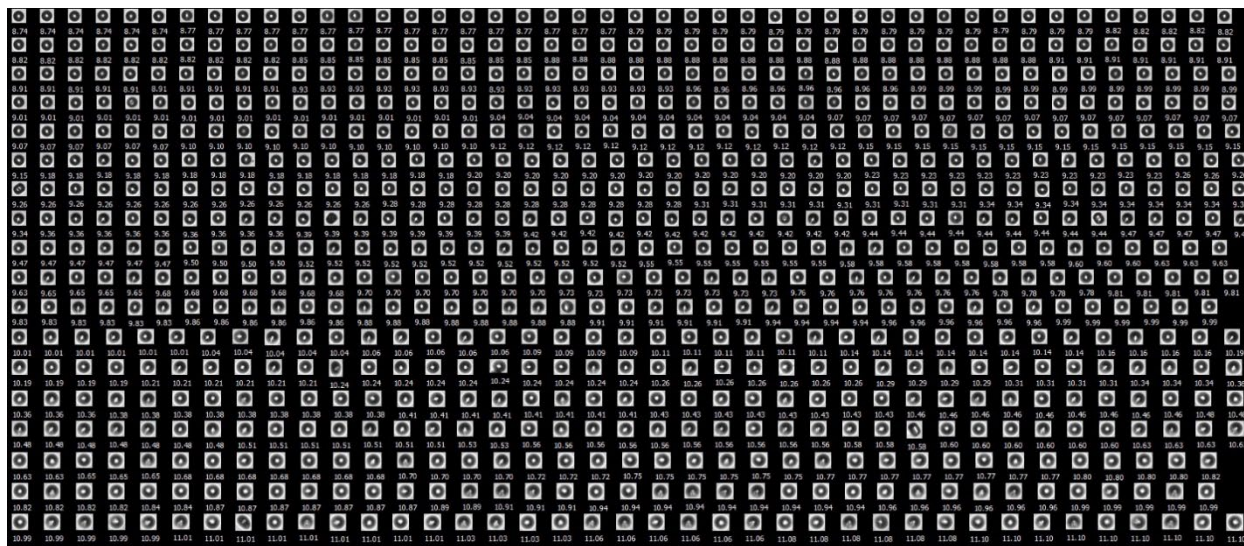
(a) 2 μm



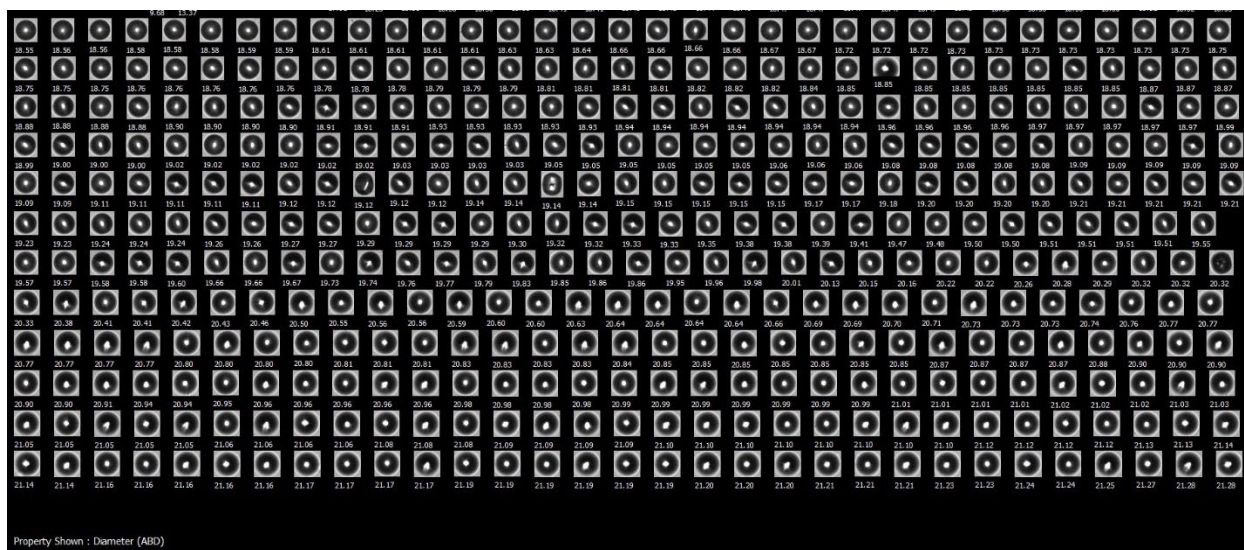
(b) 5 μm



(c) 10 μm



(d) 20 μm



(e) 50 μm

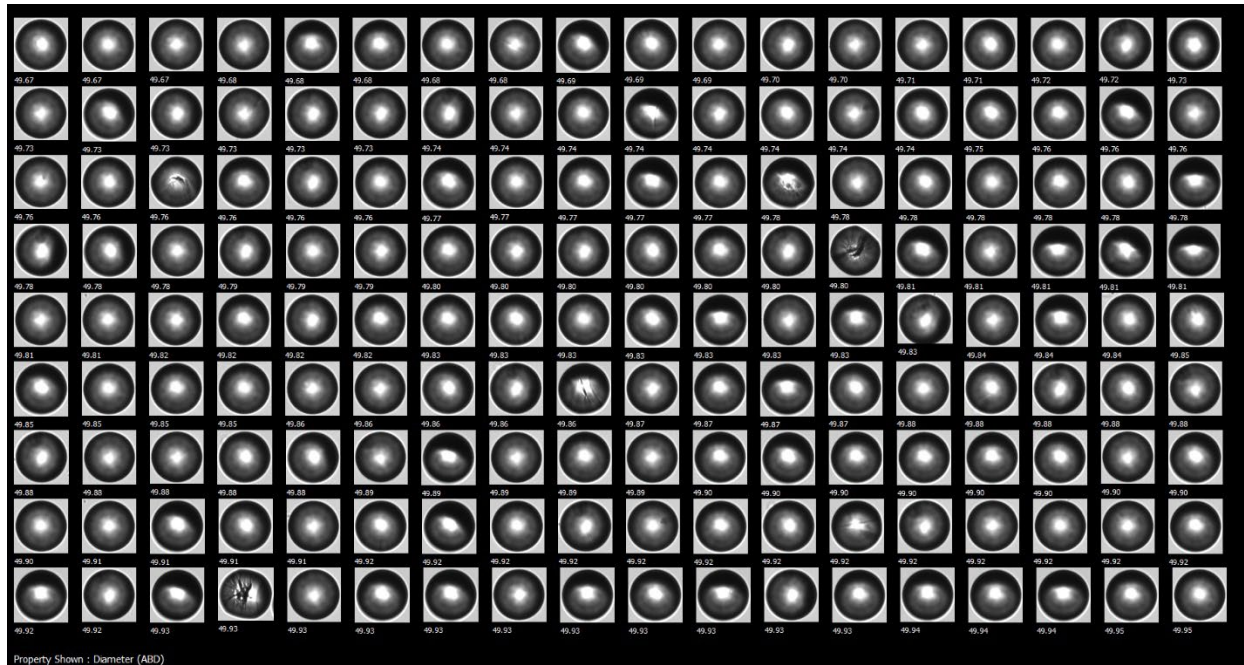
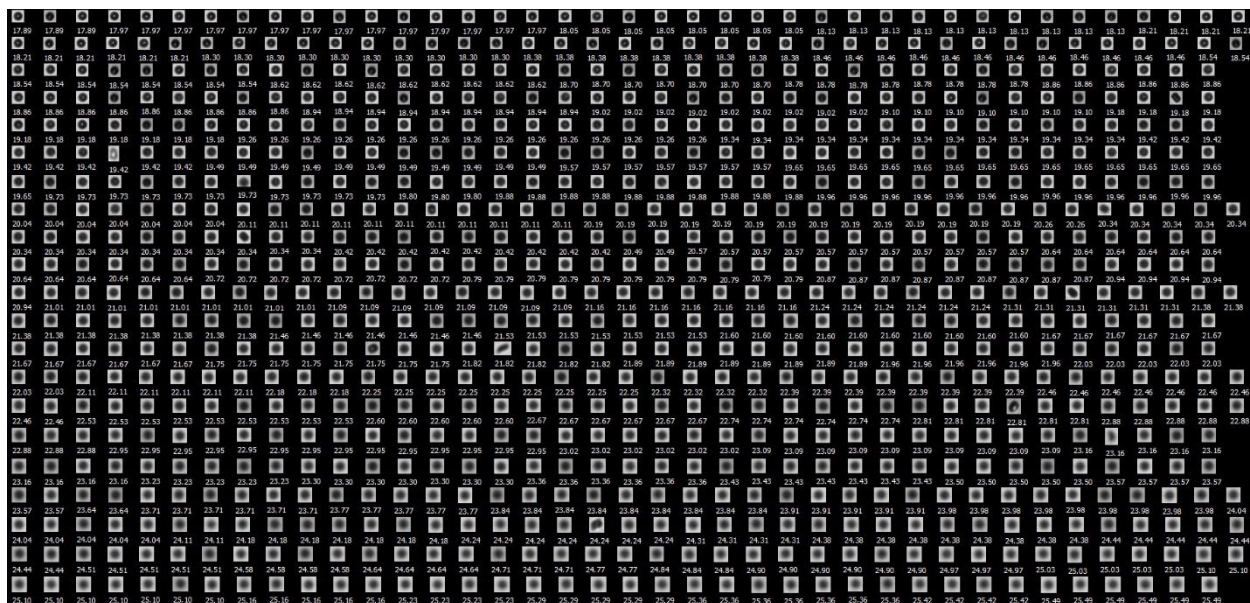


Fig. S6 Images of PSL size standards taken by FIM with 10X lens. (a) 2 μm (b) 5 μm (c) 10 μm (d) 20 μm (e) 50 μm

[illegible][illegible][illegible]

(d) 20 μm



(e) 50 μm

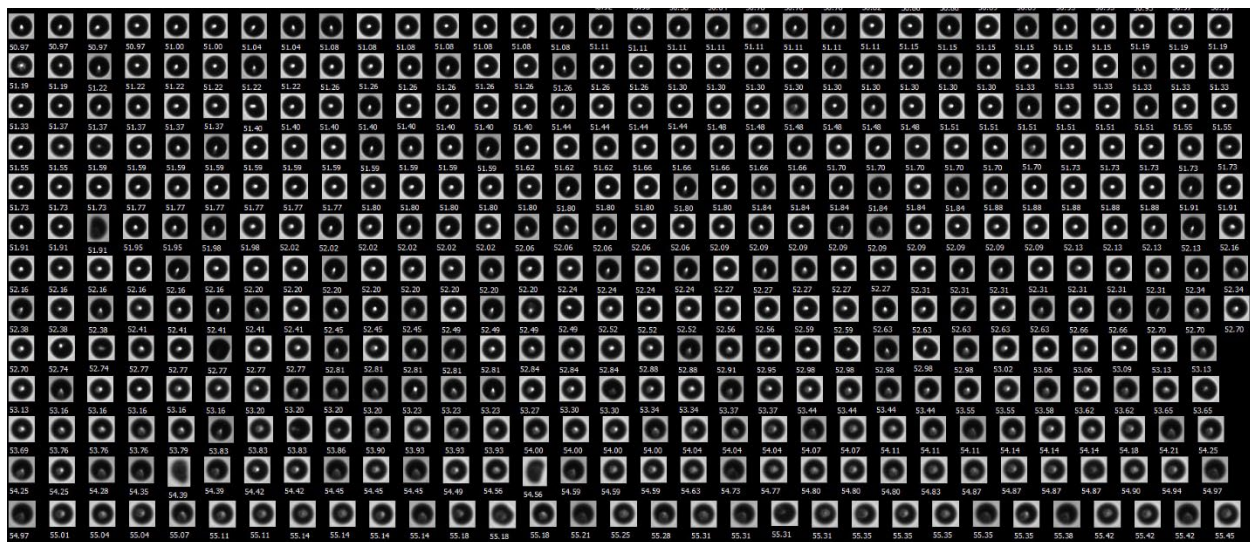
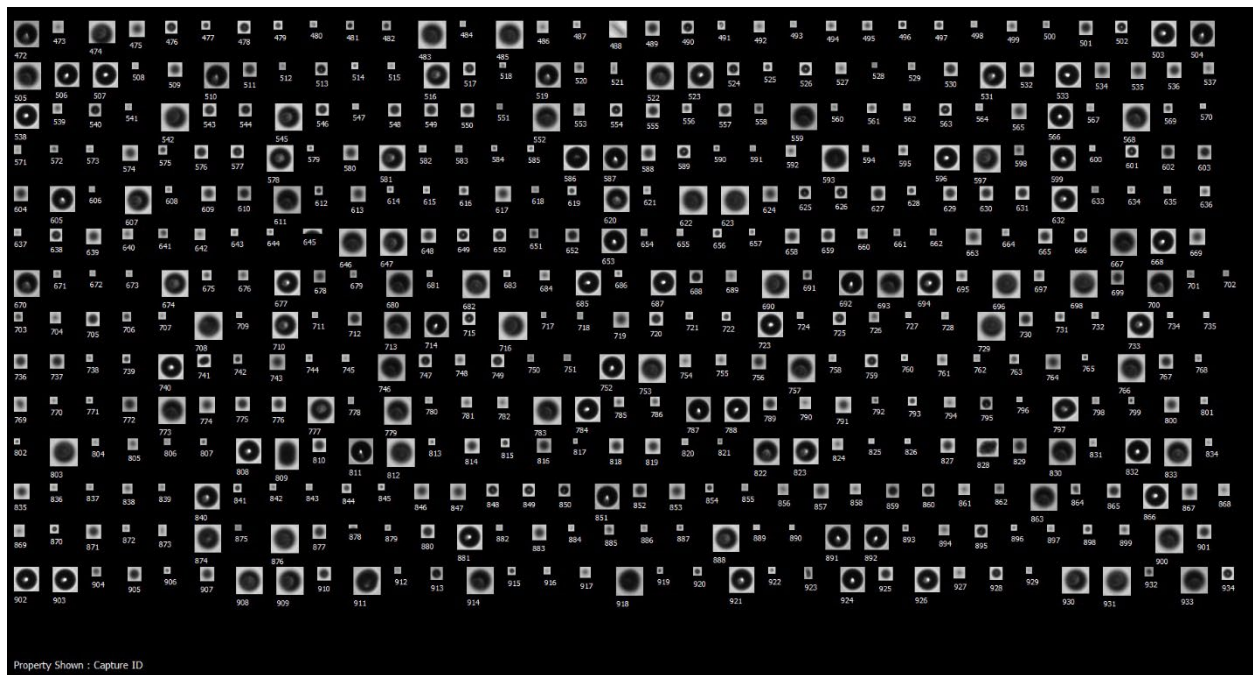


Fig. S7 Images of PSL size standards taken by FIM with 4X lens. (a) 2 μm (b) 5 μm (c) 10 μm (d) 20 μm (e) 50 μm

(a) FIM 4X



(b) FIX 10X

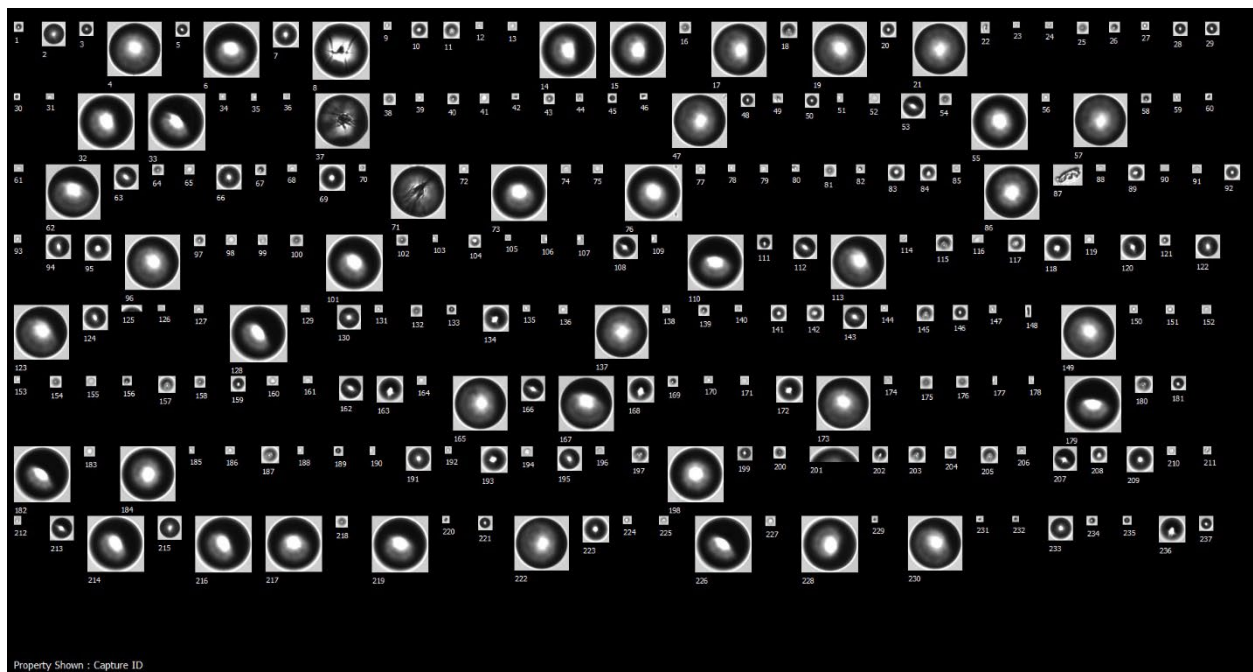


Fig. S8 Images of PSL mixed size standards (5, 10, 20, and 50 μm) taken by FIM (a) with 4X lens (b) with 10X.

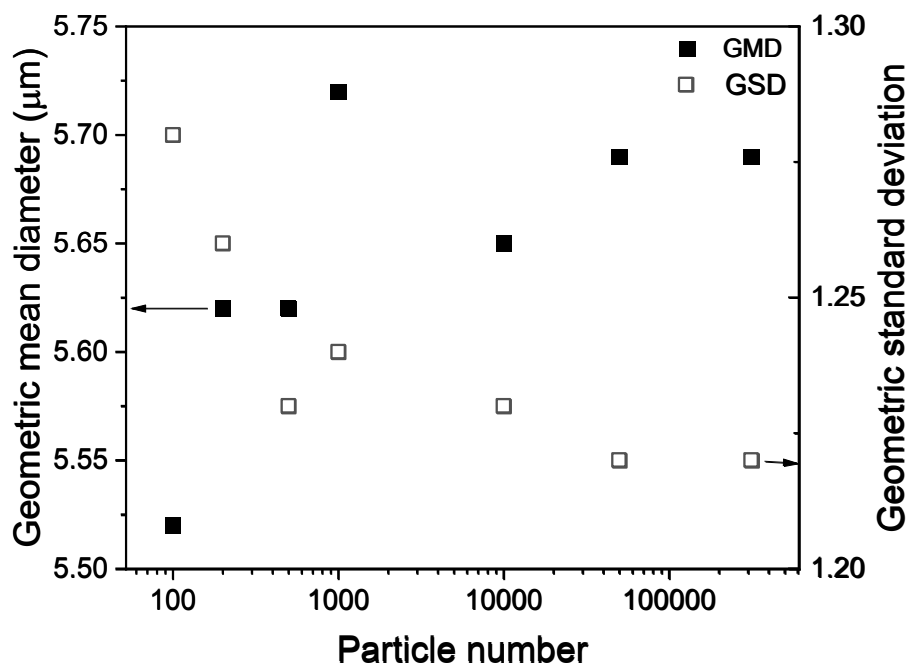
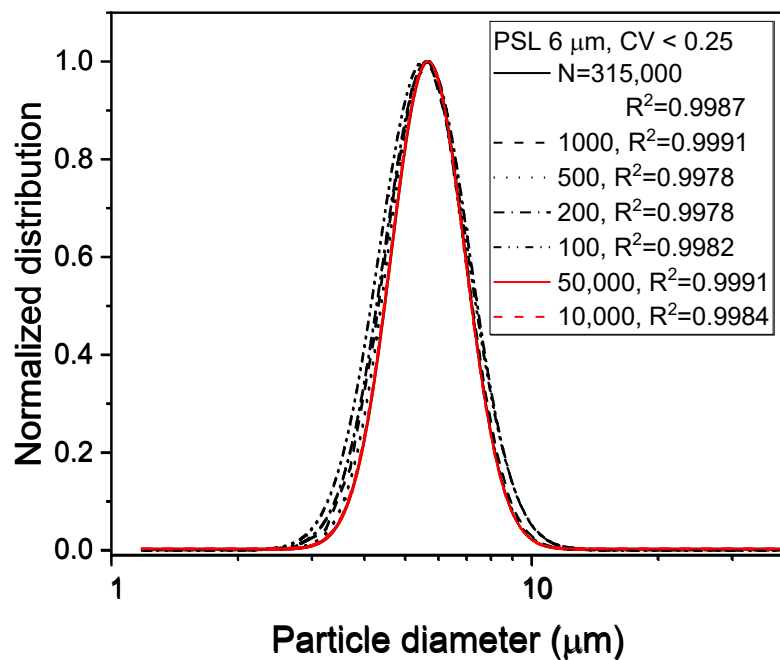


Fig. S9. Geometric mean diameter (GMD) and geometric standard deviation (GSD) measured by FIM 10X for PSL size standard (6 μm , CV < 0.25) for different PSL numbers over a four orders of magnitude range from 100 up to 315,000.

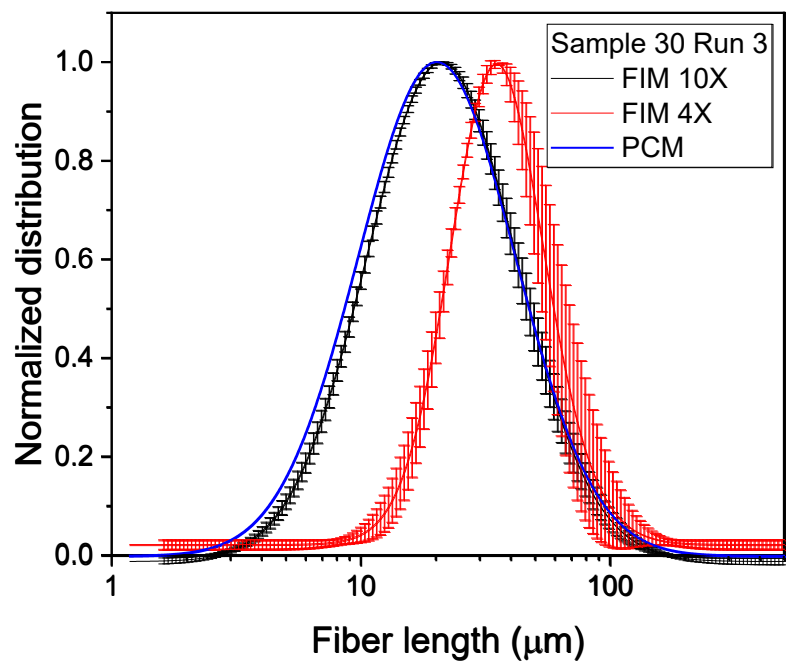
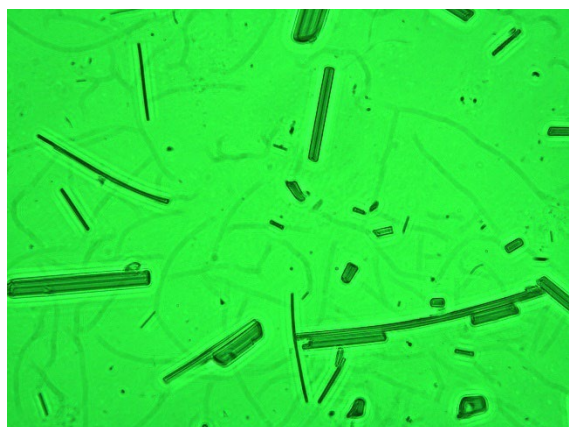
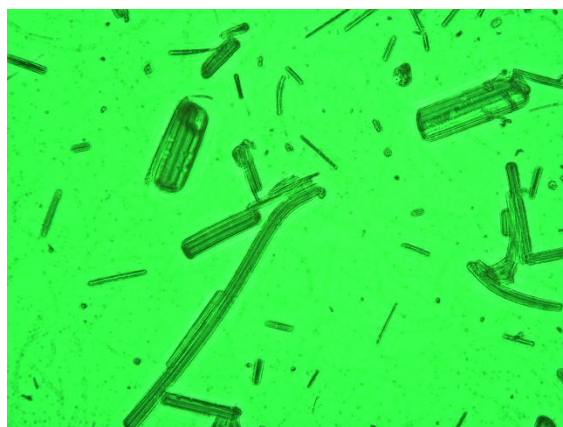


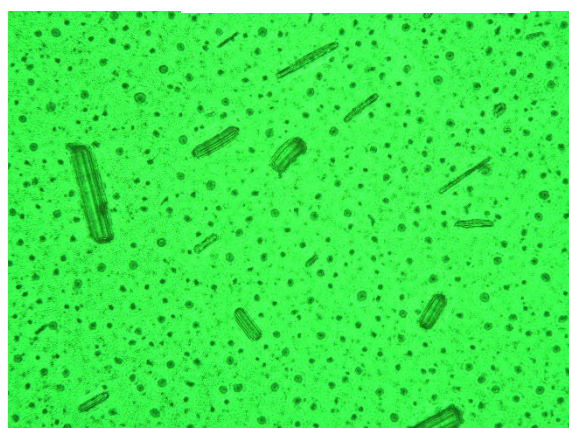
Fig. S10. Fiber length distributions measured by FIM 4X &10X compared to PCM for the sample with a fiber mean length of 20.2 μm .



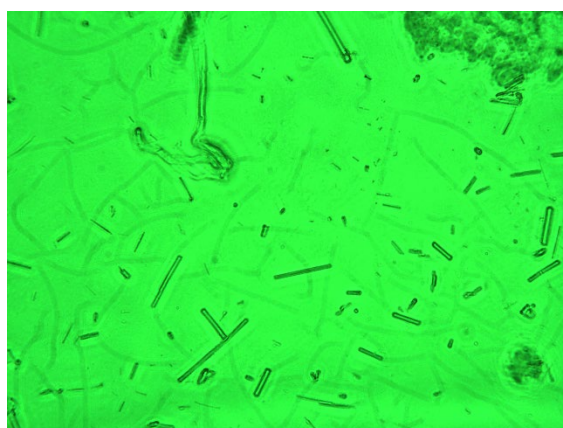
Sample A



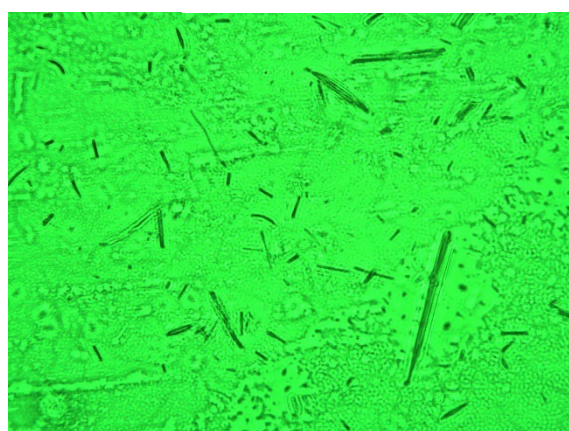
Sample B



Sample C



Sample D

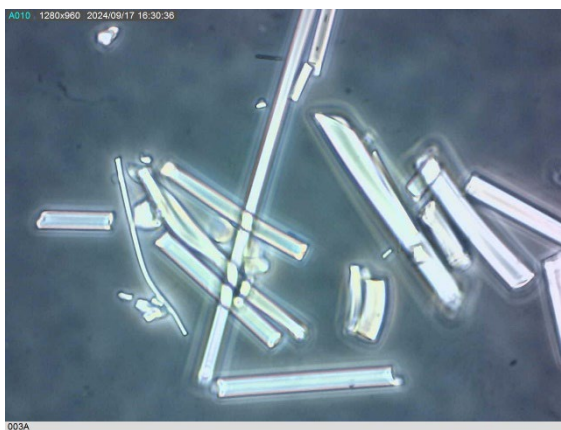


Sample E

Fig. S11 Fiber images by PCM in this study for different fiber samples



Sample A



Sample B



Sample C



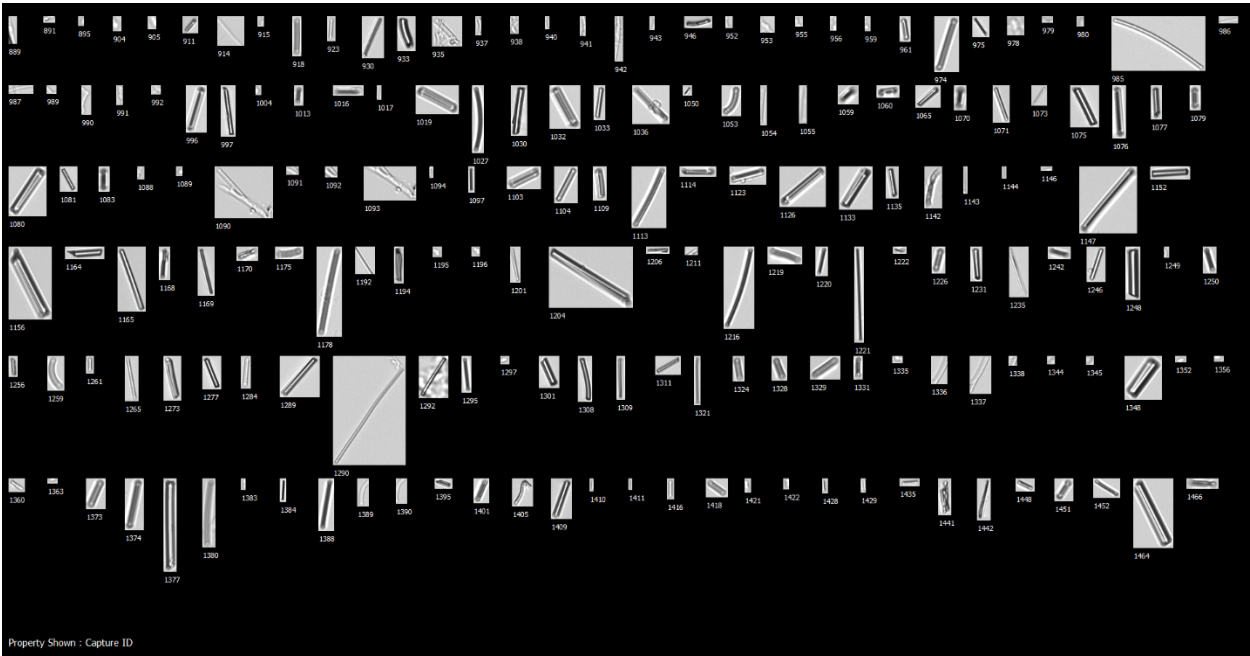
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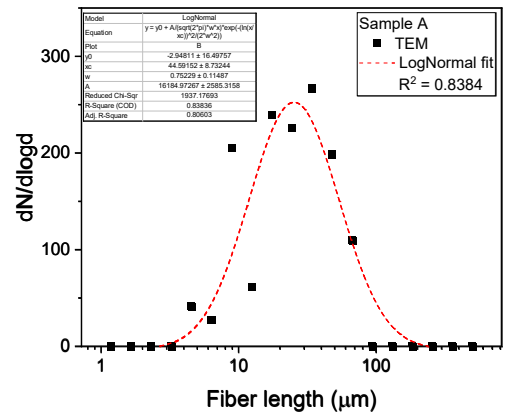
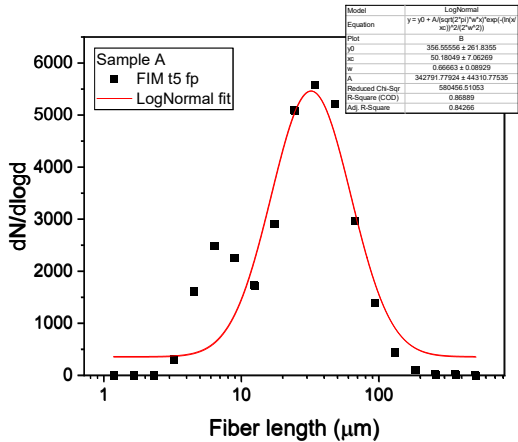
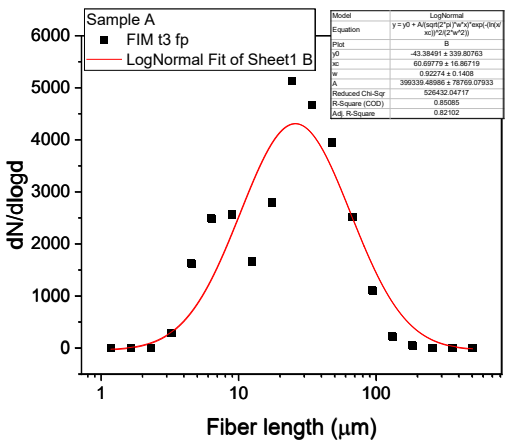
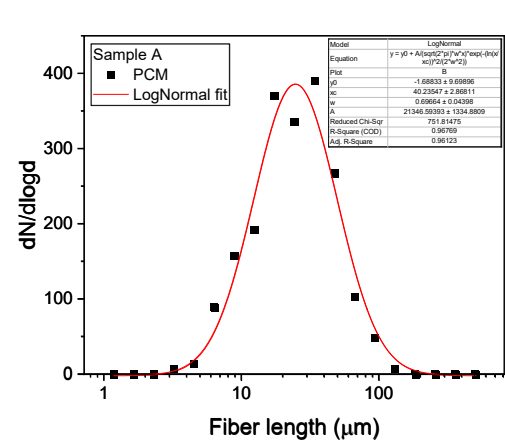
Sample E

Fig. S12 Fiber images by PCM by external laboratory for different fiber samples

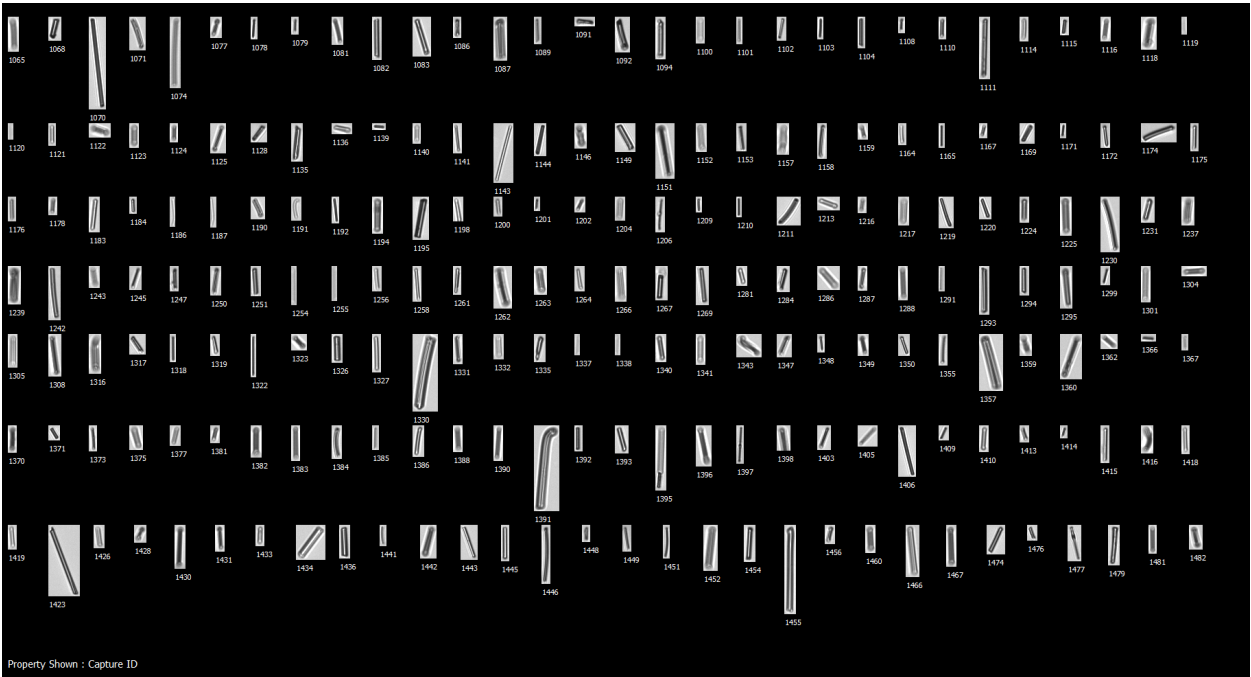
Sample A



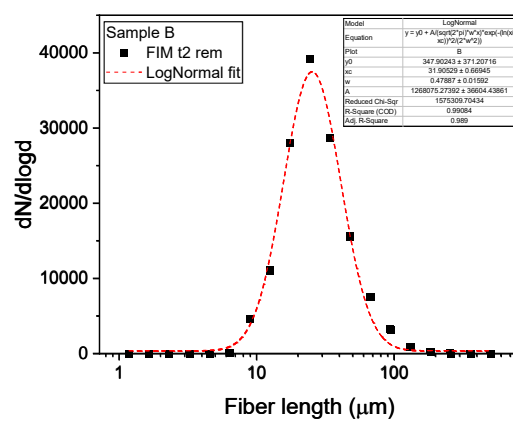
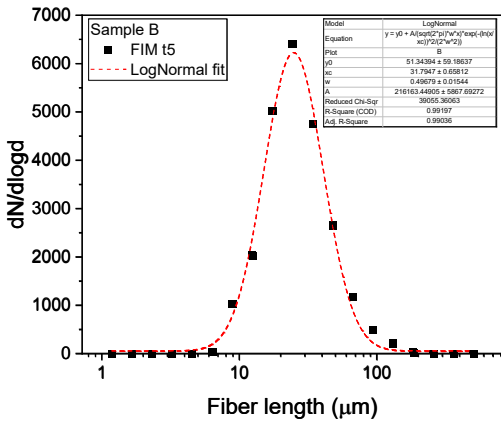
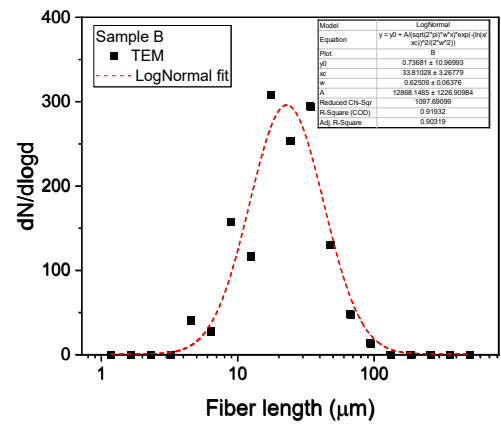
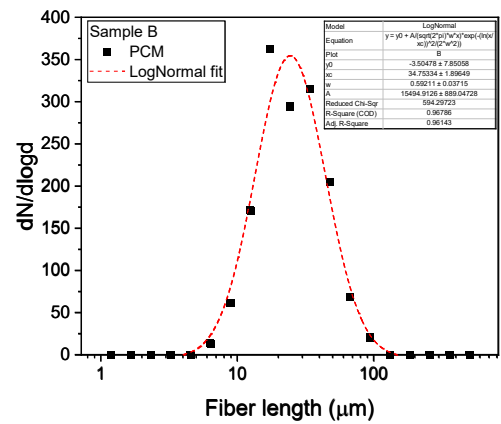
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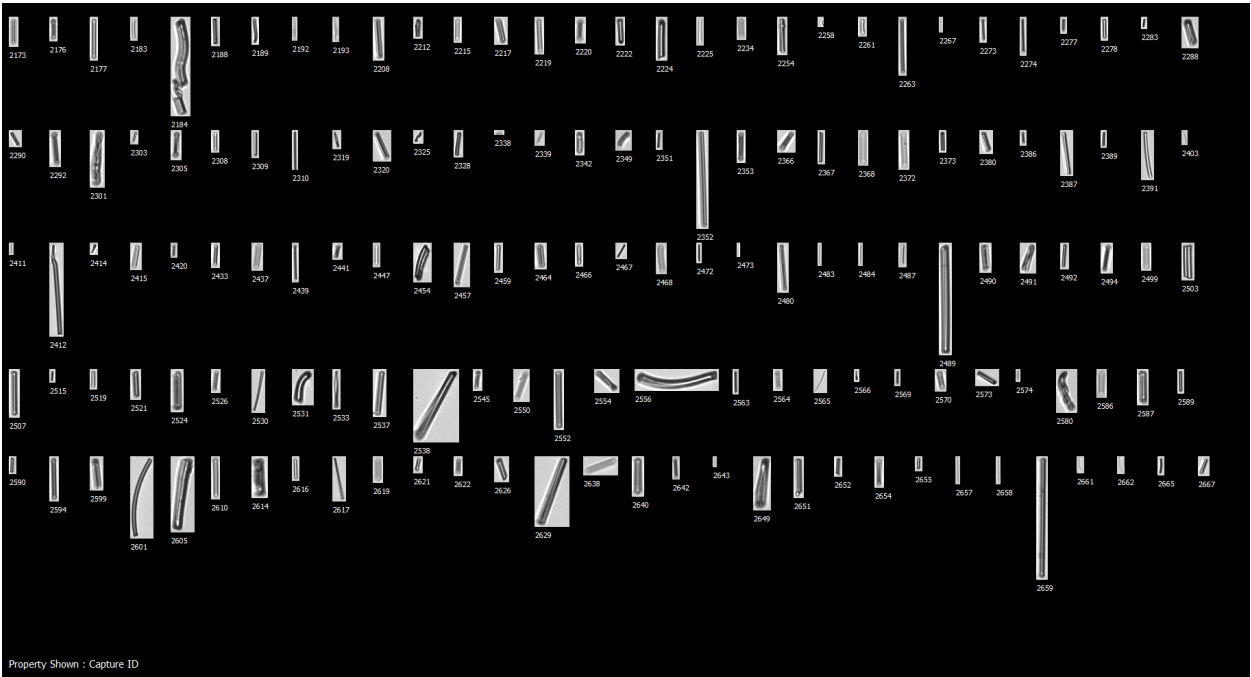
Sample B



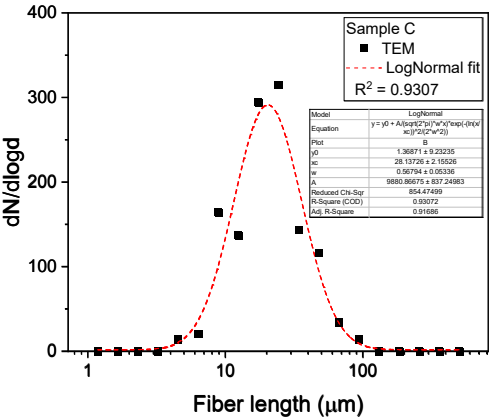
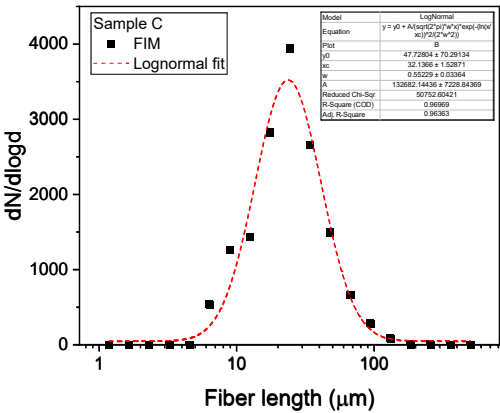
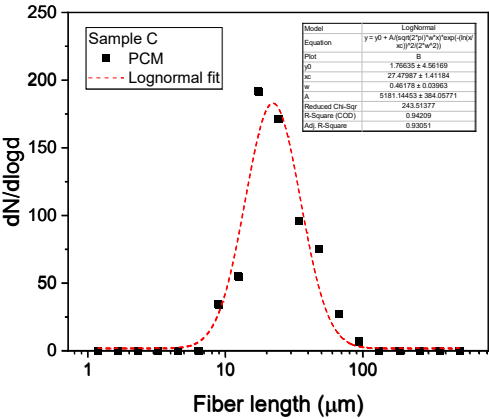
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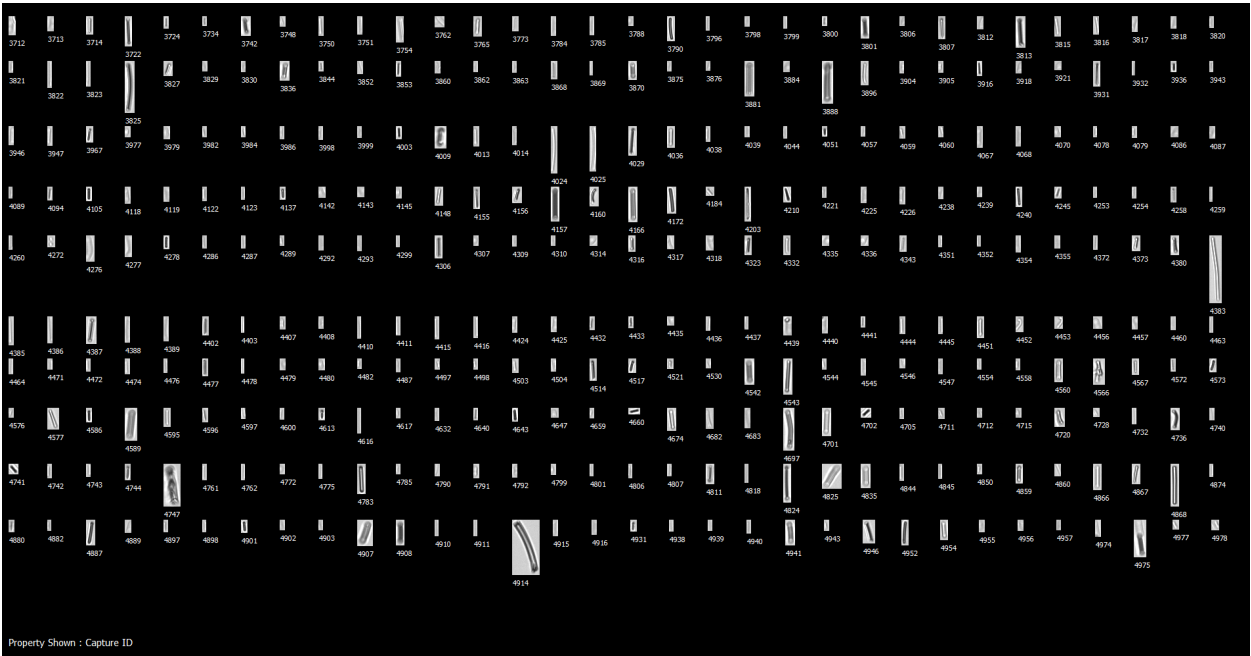
Sample C



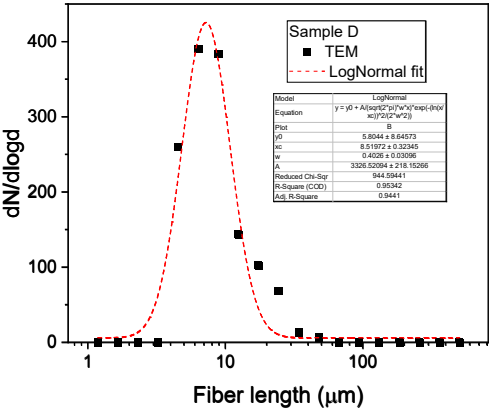
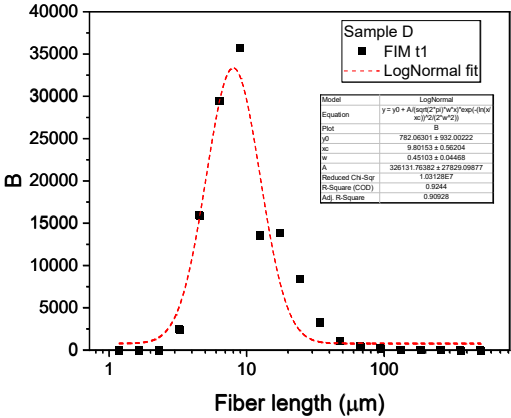
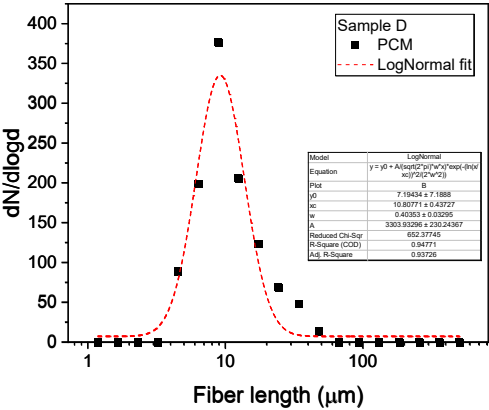
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Sample D



Property Shown : Capture ID



Sample E

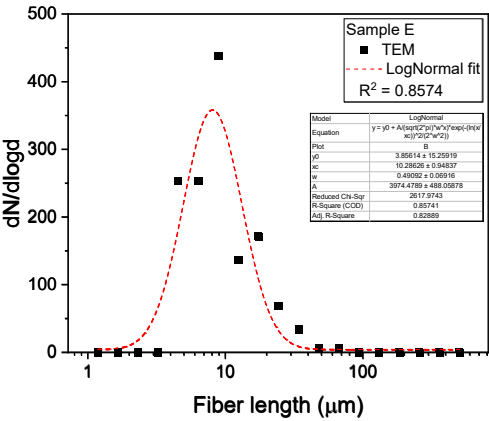
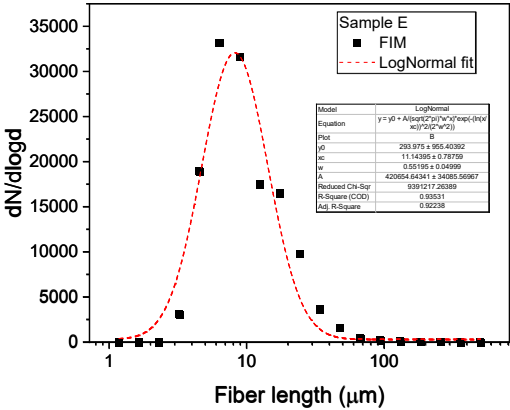
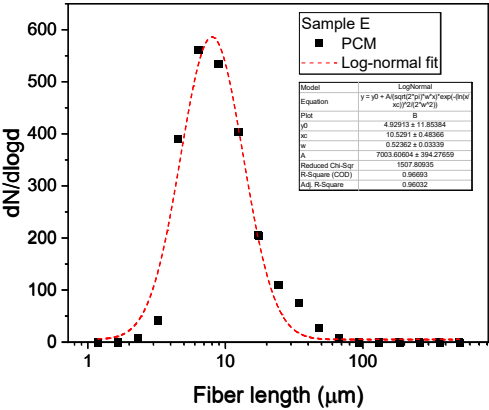
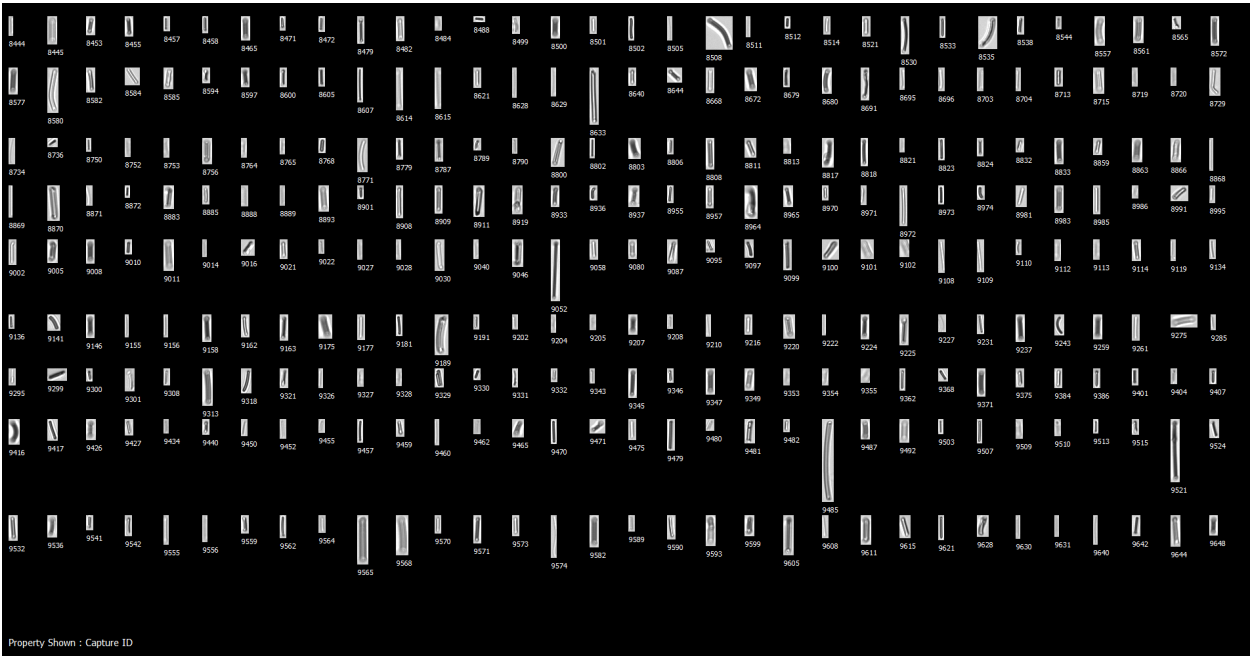


Fig. S13 Fiber images captured by FIM and lognormal fits for length distributions measured by PCM, FIM and TEM for fiber samples (A,B,C,D,E) from fiber suspensions.