Supporting Information

An imaging scheme to study the flow dynamics of Co-Flow regime in Microfluidics: Implications for Nanoprecipitation

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1. Spermine acetelated dextran synthesis

Procedure for the synthesis of SpAcDEX was adopted from the earlier work of Jessica L. Cohen, et al.[1] Briefly, Dextran (5.0 g, 30.9 mmol, Mw 9−11 000 g/mol, Sigma) was dissolved in 20ml of water (dd-H2O), followed by addition of sodium periodate (1.1 g, 51.4 mmol, Alfa Aesar) in a conical flask. Reaction mixture was stirred for 5 hours at room temperature. Solution obtained was dialyzed with deionized water using cellulose membrane (MWCO, 3500). Subsequently, water was replaced five times and lyophilisation was performed to obtain white powder. Partially oxidized dextran (18.5 mml) obtained was dissolved in DMSO (10ml) in the flask and stirred continuously until dissolved. To initiate acetelation, 2-methoxypropene (10.6 mL, 111 mmol). Spermine (4.0 g, 19.8 mmol) is added in the DMSO under continuous stirring at 50^{o}C for 22 hours. Spermine (4.0 g, 19.8 mmol) is added in the DMSO under continuous stirring at 50^{o}C for 22 hours. Following that NaBH4 (2.0 g, 52.9 mmol) was added for reduction of spermine modified partially oxidized acetelated dextran for 18 hours at room temperature under continuous stirring. Spermine modified dextran was precipitated in water (dd-H2O, 40 mL). Product was purified and washed with dd-H2O (5 × 40 mL, pH 8) by re-dispersing pellet by vortexing and sonication, followed by centrifugation (20,000g) Residual water was removed by lyophilisation to obtain spermine modified acetalated dextran as a white powder.

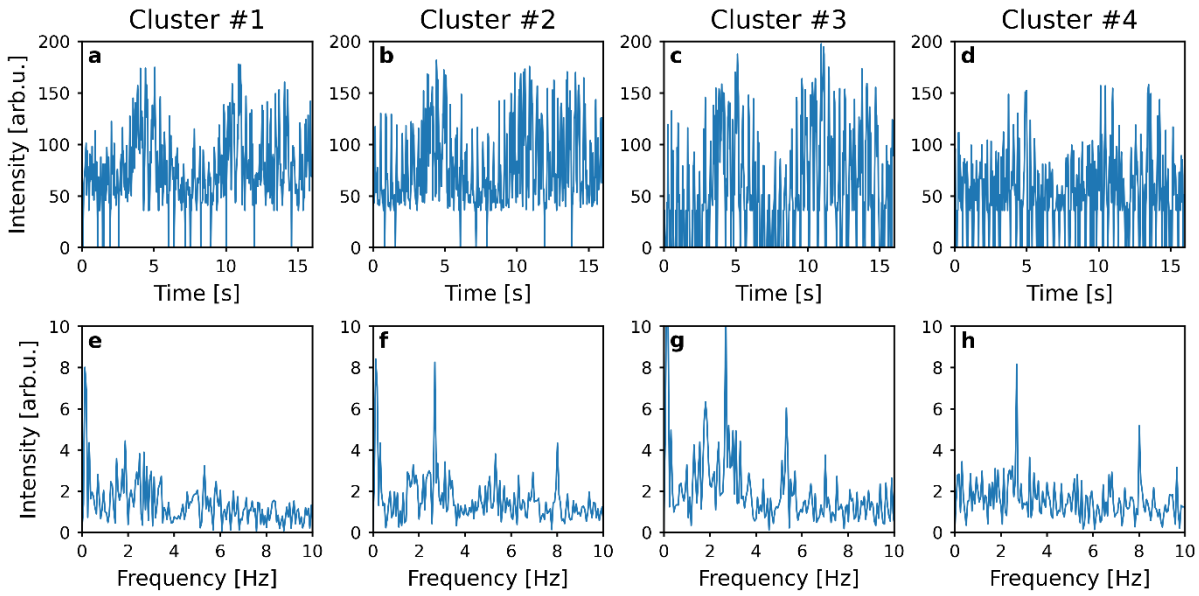

Figure S1. Above pannel shows the flow intensity vs time plot for the clusters marked in the intensity weigted density map of F1 flow regime. Intensity values are obtained from Gaussian window Mean Squared Error (MSE) after extraction from trackmate. Below pannel is frequency vs flow intensity plot for the clusters marked in the intensity weigted density map of F1 flow regime.

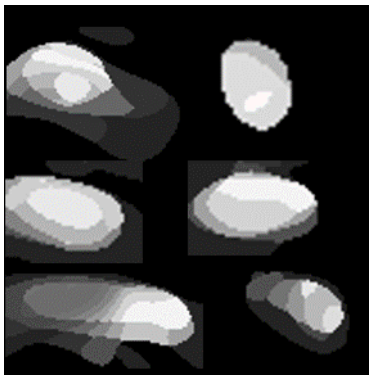

Figure S2 Fluid blobs as idenfied by Gaussian window Mean Squared Error (MSE). Fluid blobs were marked by performing thresholding (50-250) using Fiji. After thresholding, feret X (length of the pattern in X dimension) and ferret Y (length of pattern in Y dimension) were measured to perform shape analysis.

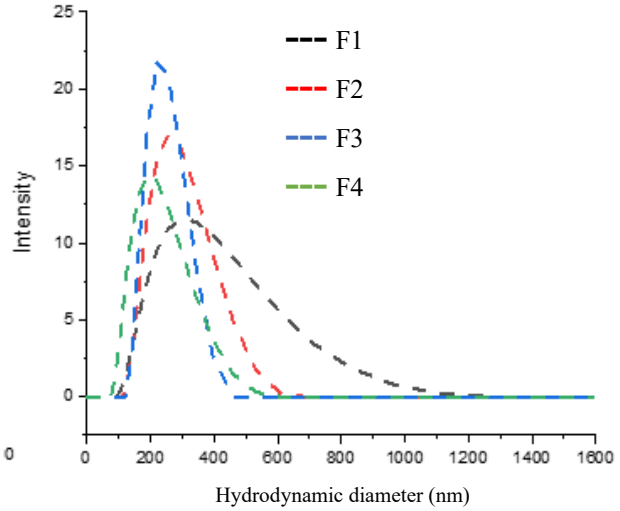

Figure S3. Size distribution pot of SpAcDEX particles synthesized by flow regimes (F1, F2, F3 and F4) at polymer concentration 2.5 mg/ml. The Intensity-weighted size distribution measured by dynamic light scattering (DLS) using Zetasizer Nano ZS.

Reference

[1] J.L. Cohen, S. Schubert, P.R. Wich, L. Cui, J.A. Cohen, J.L. Mynar, J.M.J. Fréchet, *Bioconjugate Chemistry* **2011**, *22*, 1056.