Electronic Supplementary Information (ESI)

Dynamic transformations of self-assembled polymeric microspheres

induced by AC voltage and shear flow

Nobuyuki Morimoto*, Tetsuichi Wazawa, Yuichi Inoue, Makoto Suzuki

* Corresponding author

E-mail: morimoto@material.tohoku.ac.jp, Tel: +81-22-795-7365, Fax: +81-22-795-7313

Video captions in ESI

Video S1 Fusion behaviors of PEG-SB 22-74 MLMs in an open chamber under AC voltage (10 V_{pp} and 10 milli-Hz) in water. The video plays at 10 times speed.

Video S2 Fusion and bursting behaviors of PEG-SB 22-74 MLMs in a closed chamber under AC voltage (10 V_{pp} and 100 milli-Hz) in water. The video plays at practical speed.

Video S3 Transformation behaviors of PEG-SB74 MLMs from microsphere to string-like structure under shear flow, and from string-like structure to MLMs transformation by removal of shear flow. Shear rate was 5,000 s^{-1} and performed at 25ºC. The shear flow started at 2 s and repeated flow and the stop was applied from 2 min 30 s. The video plays at double speed.

Video S4 Transformation behaviors of PEG-SB74 MLMs from microsphere to string-like structure under shear flow, and from string-like structure to MLMs transformation by removal of shear flow. Shear rate was 1,500 s^{-1} and performed at 25ºC. The video plays at 5 times speed.

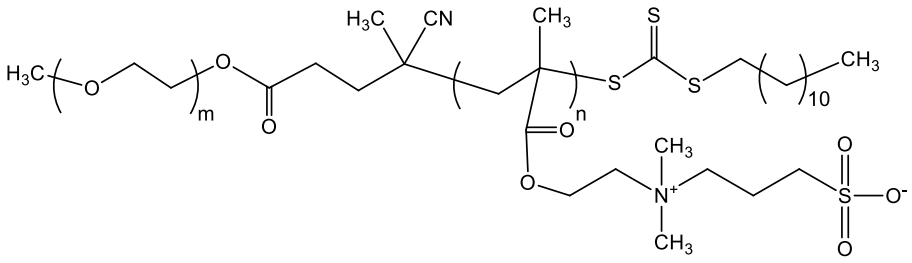

Figure S1 Chemical structure of PEG-b-PDMAPS

Table S1 Characterization of PEG-b-PDMAPS

Polymer	Polymerization degree*		Cloud point (ºC)**	Size (μm)***
	PEG	PDMAPS		
22-37	22	37	23.2 ± 1.4	7.2 ± 1.2
22-56	22	56	39.6 ± 1.6	4.8 ± 0.5
22-74	22	74	48.5 ± 1.7	1.5 ± 0.2
22-87	22	87	54.1 ± 2.3	2.6 ± 0.7
110-73	110	73	42.0 ± 1.7	1.2 ± 0.1

* Estimated by ^{1}H-NMR in D_2O containing 1M NaCl
** Determined by UV-Vis measurements at 50 % turbidity
*** Evaluated by microscopic observation (in MilliQ water)

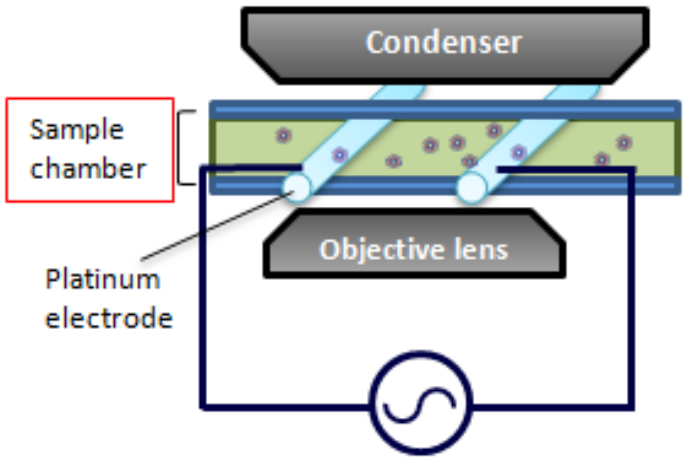

Figure S2 Schematic illustration of direct microscopic observation system under AC voltage

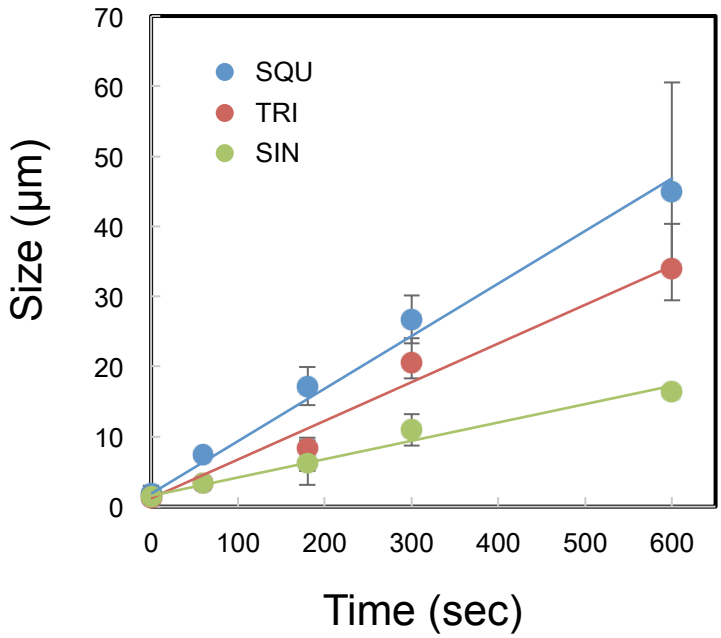

Figure S3 Wave form effect on size-growth rate of 22-74 MLMs. SIN: sine wave, TRI: triangle wave, SQU: square wave. The frequency was 100 mHz

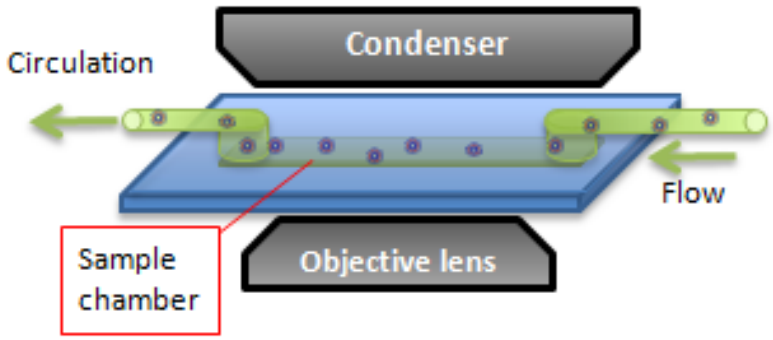

Figure S4 Schematic illustration of direct microscopic observation system for controllable shear flow