



Title	Mechanical Model for Super-Anisotropic Swelling of the Multi-Cylindrical PDGI/PAAm Gels
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# Supplementary Materials for

## Mechanical model for super-anisotropic swelling of the multi-cylindrical PDGI/PAAm gels

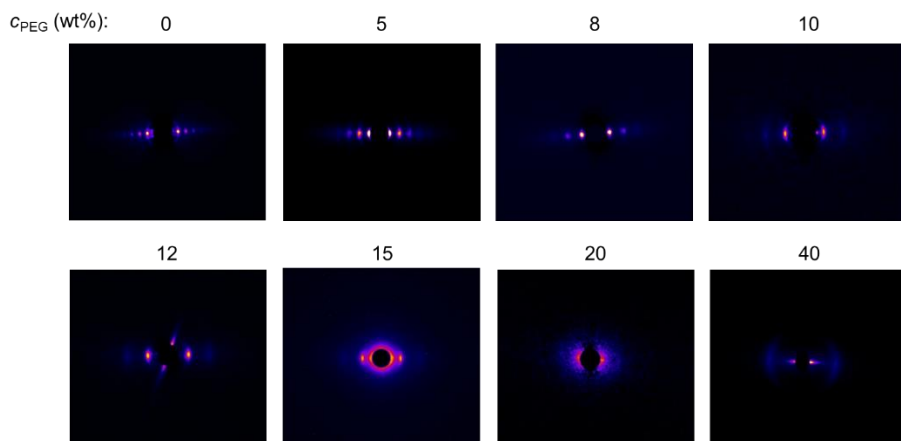
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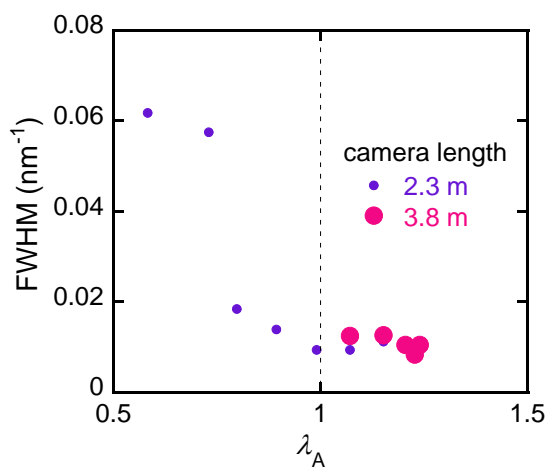
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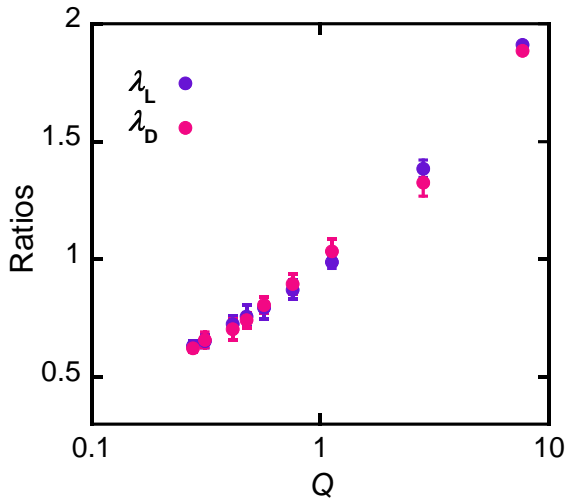
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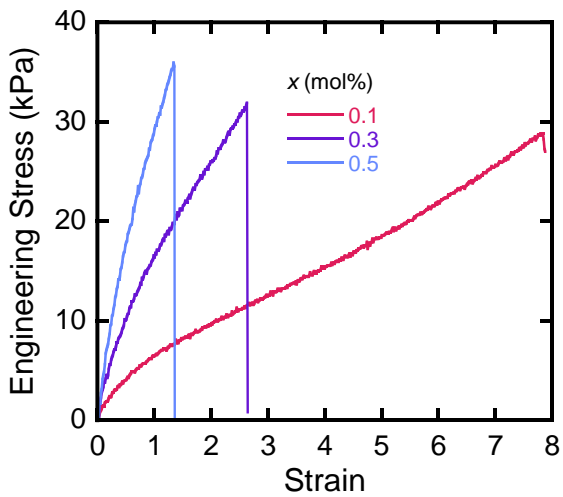
**Figure S1.** 2-D X-ray diffraction image of the MC-PDGI/PAAm(0.1) gel swollen in PEG aqueous solutions.



**Figure S2.** FWHM of the first-order X-ray diffraction peak of the MC-PDGI/PAAm(0.1) gel in the swelling regime, measured with longer camera length.



**Figure S3.**  $\lambda_L$  and  $\lambda_D$  of the string PAAm(0.1) gels as functions of  $Q$ . Reproduced from the data shown in ref. 18 (K. Mito *et al.*, *Polymer* 2017, 128, 373–378), Copyright 2017, with permission from Elsevier.



**Figure S4.** Uniaxial stress-strain curves of the rectangular PAAm( $x$ ) gels at their reference state, where  $x=0.1$ , 0.3 and 0.5. The gels were cut into the dumbbell shape (gauge length: 12 mm, width: 2 mm) and tested. Strain rate was  $0.14 \text{ s}^{-1}$ . Young's modulus of the gel was determined as initial slope of the curve.  $G_{\text{net}}(x)$  was calculated by dividing the Young's modulus by 3.

	Supplier	Assay
Acrylamide	Junsei Chemicals	98%+
<i>N,N'</i> -Methylenebisacrylamide	Wako Pure Chemical Industries	99%+
Irgacure 2959	BASF SE	99%
Sodium dodecyl sulfate	MP Biomedicals	99%+
Polyethylene glycol (Mn: 21,170)	Wako Pure Chemical Industries	~100%
Itaconic acid anhydride	Sigma Aldrich	95%+
Dodecanol	Wako Pure Chemical Industries	95%+
Glycidol	Wako Pure Chemical Industries	90%+
Pyridinium <i>p</i> -toluenesulfonate	Wako Pure Chemical Industries	97-102% (by titration)

**Table S1.** List of the chemicals used in this study with their supplier and standard assay.