Supporting information

Tunable Molecular Sieving in Gel Electrophoresis
Using a Poly(ethylene glycol)-Based Hydrogel

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**Preparation of an agarose gel**
An agarose powder was dispersed in 1 × TBE buffer at 1.0 wt% against the solvent. The solution was stirred and heated (90 ºC) until agarose was completely dissolved. Then, after cooling down less than 70 ºC, the solution was poured to a gel-tray, 130 mm × 59.5 mm × 13 mm (height) and left at room temperature for 20 min.

**YOYO-1 labeling**
The defrosted each DNA was mixed with 1.0 mM YOYO-1 and stirred with Vortex stirrer. Then, the mixture was diluted with 0.5 × TBE buffer and left at room temperature for 1 h.

**APTS derivatization**
5 % APTS in water of 3.0 μL was mixed with 100 mM each glucan in water of 3.0 μL, acetic acid of 2.25 μL, and water of 6.75 μL. Then, 1M NaBH₃CN/ in tetrahydrofuran of 5.0 μL was added to the solution, the mixture left at 55 ºC for 2 h. After the reaction, the mixture was diluted with water of 30 μL.
Fig. S1. Irreversible shrinking of the gel in astrazon orange R. Gel: 0.9 mmol PEG-DMA, 14 mL MeOH/water = 9/5 (v/v), 1.0 wt% AIIZP toward monomers, and 2.1 mmol sodium \( \rho \)-styrenesulfonate (SS).

Fig. S2. Photo images of swelling and shrinking of the gel. Gel: 0.9 mmol PEG-DMA, 14 mL MeOH/water = 9/5 (v/v), 1.0 wt% AIIZP toward monomers, and 2.1 mmol vinylbenzyl trimethylammonium chloride (VBTMAC). Immersed solution: (a) water, (b) 10 mM sodium 2-naphthalenesulfate aq., (c) 50 mM NaCl aq., (d) water.
Fig. S3. Breaking of the gel under voltage applying in electrophoresis. Gel: 0.9 mmol PEG-DMA, 14 mL MeOH/water = 9/5 (v/v), 1.0 wt% AI2P toward monomers, and 2.1 mmol (a) SS or (b) VBTMAC. Electrophoresis: migration solution, 1 × TBE buffer; applied voltage and time, 100 V for 30 min.