

# **Tough and Variable-Band-Gap Photonic Hydrogel Displaying Programmable Angle-Dependent Color**

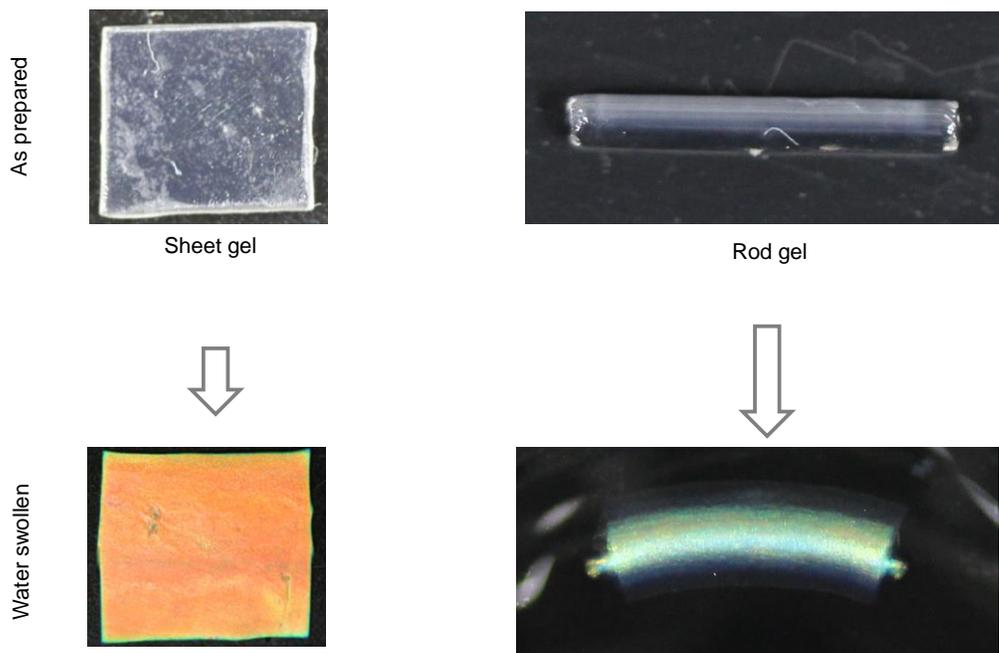
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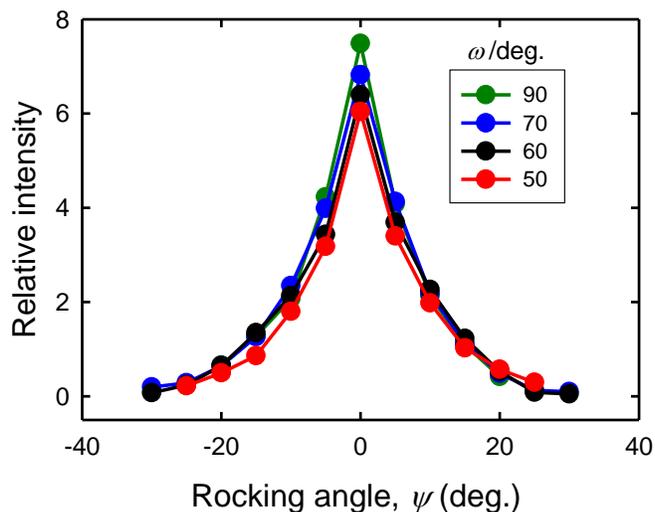
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## 1. Photographs of as prepared gel and after swelling



**Figure S1:** Photographs of gel sheet (left column) and rod (right column) taken at as prepared state (bottom row) and after equilibrium swollen in water (top row). Before swelling, both the gel sheet and rod are nearly transparent and show pale violet color. After swelling, gel sheet turns to orange whereas rod turns to green. For sheet geometry, swelling ratio along the thickness is  $\sim 2.2$  due to the free swelling of PAAm chain whereas along the length and width is  $\sim 1$  due to the restriction by sheet lamellae. On the other hand, gel rod swells along the diameter ( $\sim 1.6$ ) but shrinks along the longitudinal direction. Both gels are prepared at identical compositions (0.1 M DGI, 2.0 M AAm, and 0.1 mol% crosslinker *w.r.t.* AAm).

## 2. Rocking curve at various angle ( $\omega$ ) of plane



**Figure S2:** Reflection intensity as a function of rocking angle ( $\psi$ ) keeping at various angles ( $\omega$ ) between incident and reflection beam. Significant decrease in peak intensity even at small rocking angle for the sheet gel is noticed for various angles,  $\omega$ .

**Movie-1:** Real-time movie was taken by a conventional video camera to show the angle-dependent color of gel sheet.

**Movie-2:** Real-time movie was taken by a conventional video camera to show the angle-independent color of gel rod.