

ADVANCED OPTICAL MATERIALS

Supporting Information

for *Adv. Optical Mater.*, DOI 10.1002/adom.202500053

Chiral Sensing of Amino Acids under Visible Light via Hydroxypropyl Cellulose Gels

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Supporting Information

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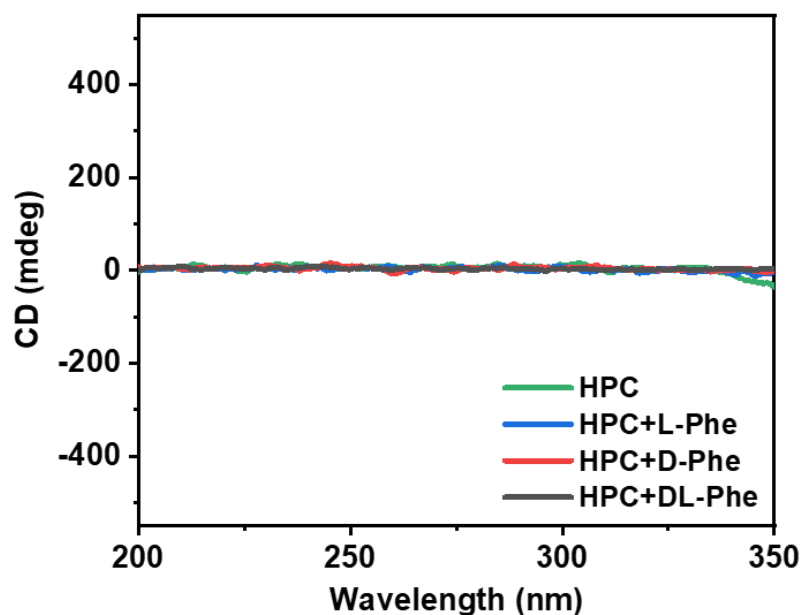


Figure S1. UV CD spectra of HPC gel, HPC/L-Phe gel, HPC/D-Phe gel, and HPC/DL-Phe gel at 65 wt%.

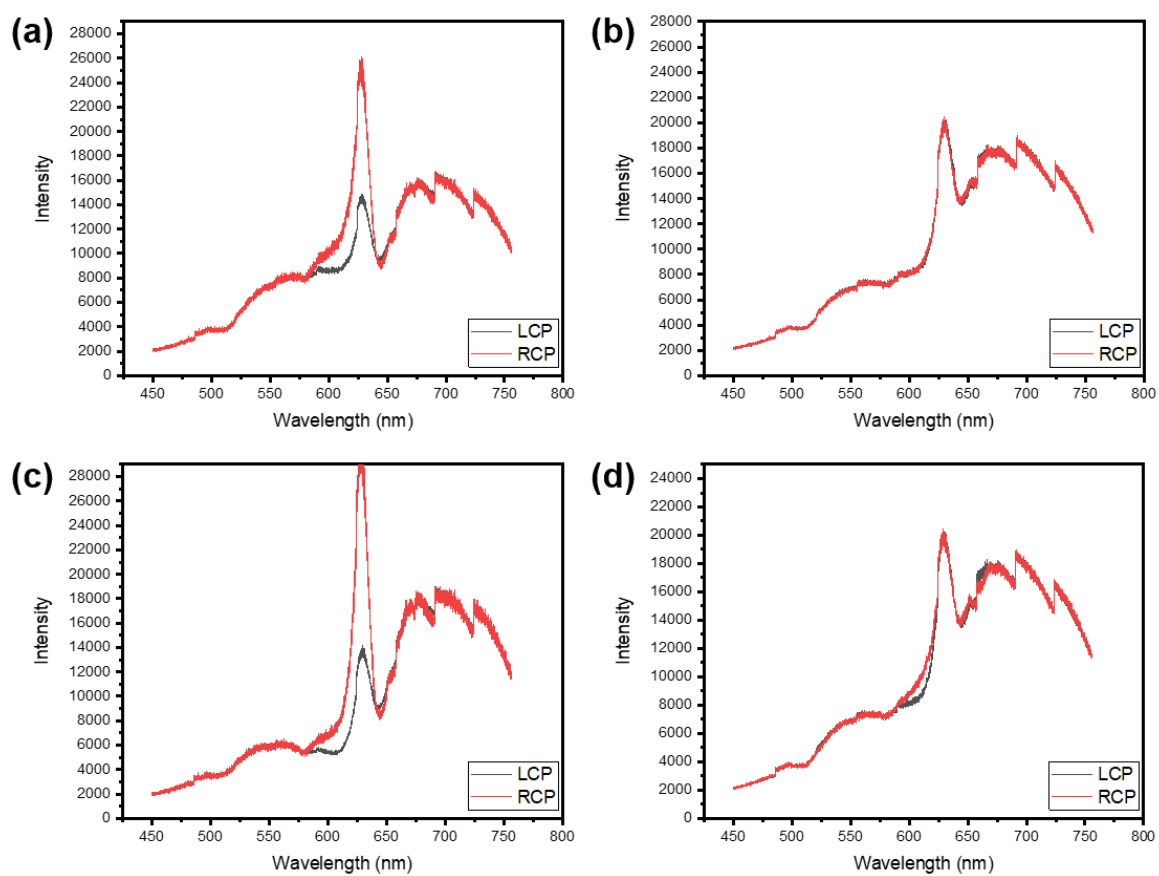


Figure S2. Different absorption of LCP and RCP in CD spectra for (a) HPC gel, (b) HPC/L-Phe gel, (c) HPC/D-Phe gel, and (d) HPC/DL-Phe gel at 65 wt% concentration with 0.2 wt% of Phe.

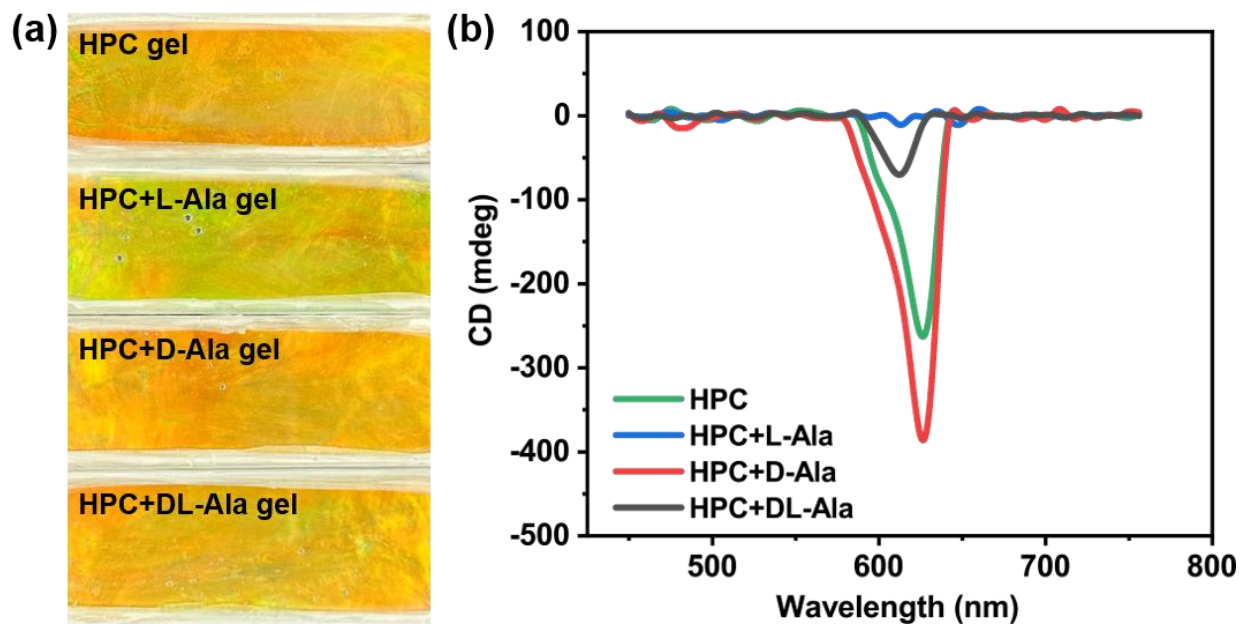


Figure S3. (a) Photographs of HPC-alanine gels. (b) Corresponding CD spectra of HPC-alanine gels. The concentration of L-Ala, D- Ala, and DL- Ala is 0.2 wt% in each of the 65 wt% HPC/ Ala gels.

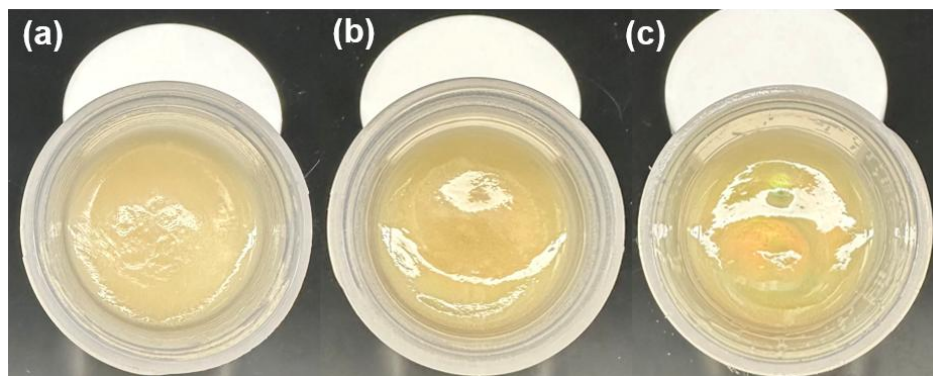


Figure S4. Visualization of the gels. (a) freshly prepared HPC gel, (b) HPC gel after 5 minutes of standing, (c) HPC gel after 3 hours of standing. As shown in Figure S4, the freshly prepared gel initially appears milky due to the presence of air bubbles introduced during high-speed mixing. After waiting for just 5 minutes, the gel begins to exhibit structural color, which becomes increasingly distinct over time. With prolonged resting, a vibrant orange structural color emerges.

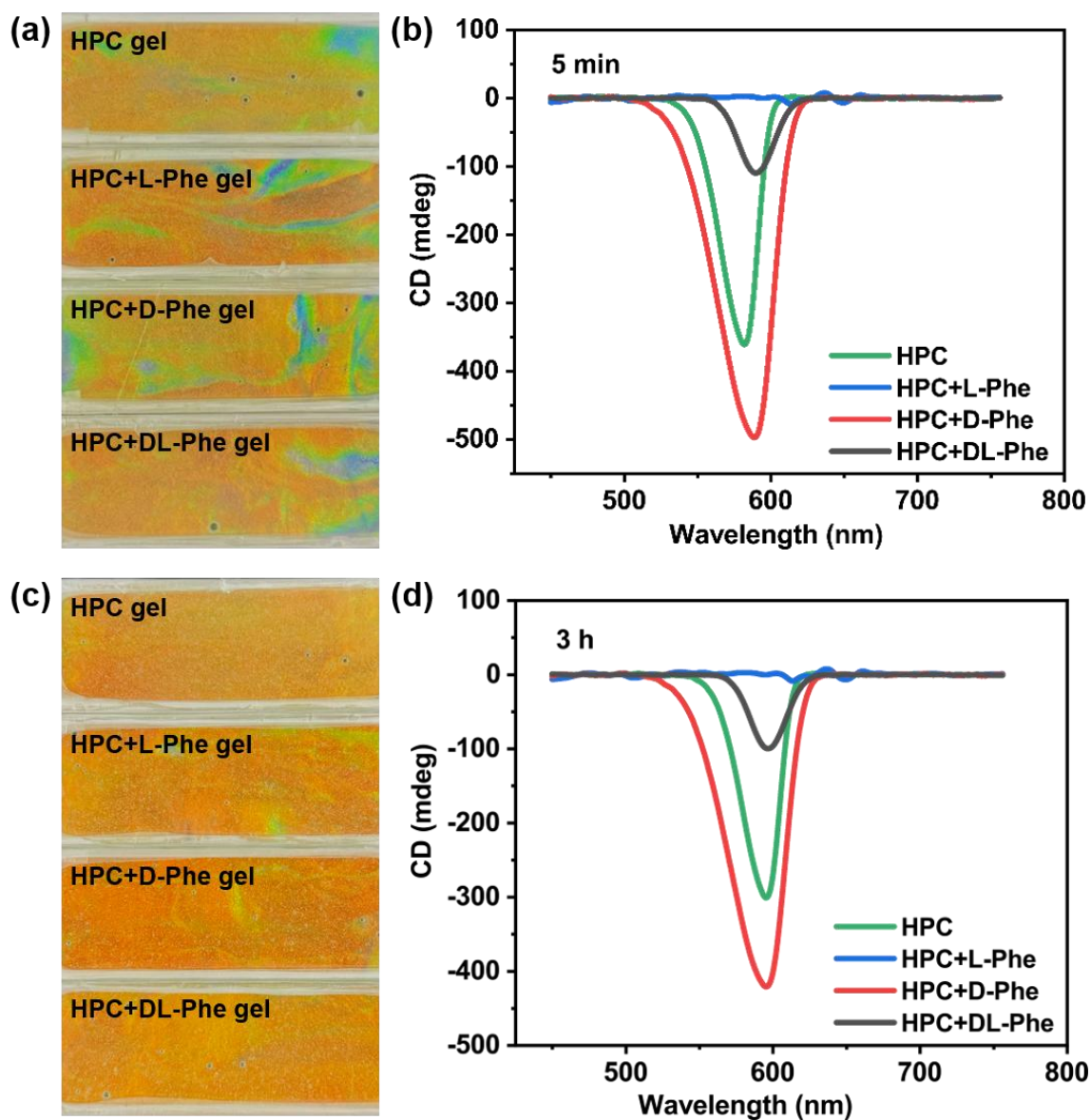


Figure S5. HPC/Phe gels after 5 minutes of standing (a) and their CD spectra (b), HPC/Phe gels after 3h of standing (c) and their CD spectra (d). All HPC/Phe gels were at 65% concentration. We also analyzed the gels that were left to stand for 5 minutes and 3 hours, respectively, by coating and testing their CD properties. In Figure S5 (a), the structural color of the 5-minute gel appears slightly uneven because air bubbles near the surface had partially dissipated, while many remained trapped in the lower gel layers. However, the corresponding CD data in Figure S5 (b) revealed

consistent trends: L-Phe reduced the CD signal intensity, while D-Phe enhanced it, mirroring the results from centrifuged samples. With increased standing time, the color homogeneity improves, as seen in Figure S5 (c), where the orange structural color is more uniform.

Table S1. Comparison of our work and the literature.

Ref	Analytes	Methods	Complexity of Experiment
Ref.1 ^[1]	Various chiral compounds	Chiral recognition via electrochemical sensors using cellulose derivatives.	Medium
Ref.2 ^[2]	Chiral compounds	Fluorescence-based enantioselective detection employing cellulose derivatives.	Hard
Ref.3 ^[3]	Chiral compounds	Colorimetric sensing using cellulose-based nanopaper.	Medium
Ref.4 ^[4]	Tryptophan enantiomers	A transistor-based approach utilizing localized cellulose layer for detection.	Medium
Ref.5 ^[5]	Chiral amino acids	Localized cellulose layer transistor effect applied for chiral amino acid sensing.	Medium
Ref.6 ^[6]	Tryptophan enantiomers	Via chiral recognition of tryptophan using carboxymethyl cellulose.	Hard
Ref.7 ^[7]	Chiral compounds	Fluorescence sensor utilizing cellulose for chiral compound recognition.	Hard
Ref.8 ^[8]	Chiral compounds	Cellulose-derivative fluorescence sensing for chiral detection.	Hard
Ref.9 ^[9]	Chiral compounds	Transistor effect with localized cellulose layer for chiral compound analysis.	Medium
Ref.10 ^[10]	Methanol	Localized cellulose transistor effect for methanol detection.	Medium
This work	Chiral amino acids	Via Colorimetric sensing using cellulose-based mixture with amino acid.	Easy

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