

Electronic Supporting Information

## Intercellular Lipids-Cored, Hectorite Nanoplatelets-Armored Pickering Emulsions with Enhanced Transdermal Delivery and Epidermal Hydration

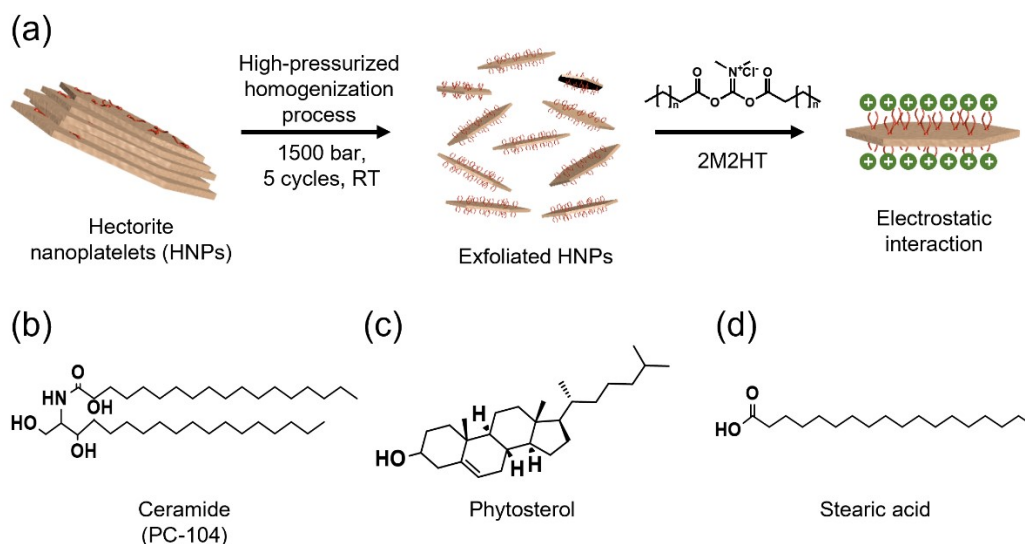
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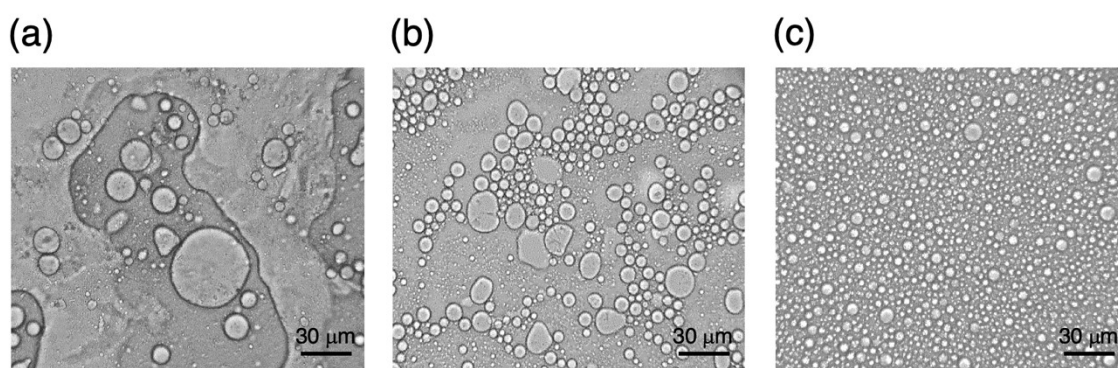
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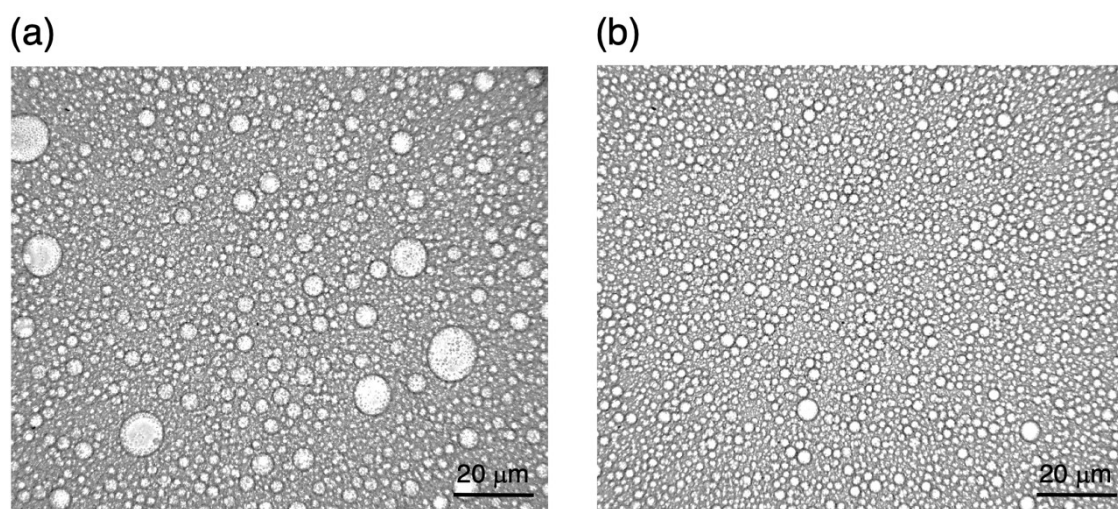
### Supporting data



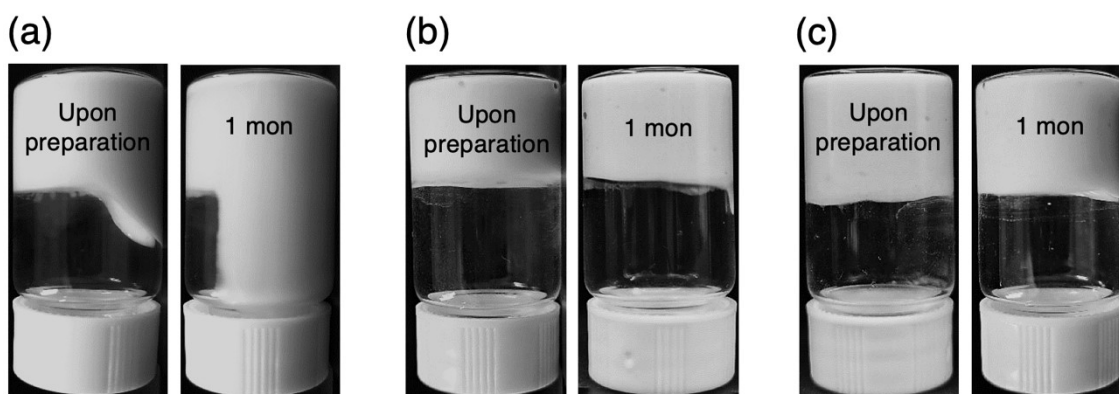
**Figure S1.** Schematic illustration of the preparation process and key components of intercellular lipid-based Pickering emulsions (ILPEs). (a) The high-pressure homogenization process used to exfoliate hectorite nanoplatelets (HNPs), followed by their stabilization with a cationic surfactant, dimethyl dehydrogenated tallow ammonium chloride (2M2HT), through electrostatic interaction (Ref 1). Chemical structures of the intercellular lipids used: (b) Ceramide (PC-104), (c) Phytosterol, and (d) Stearic acid.



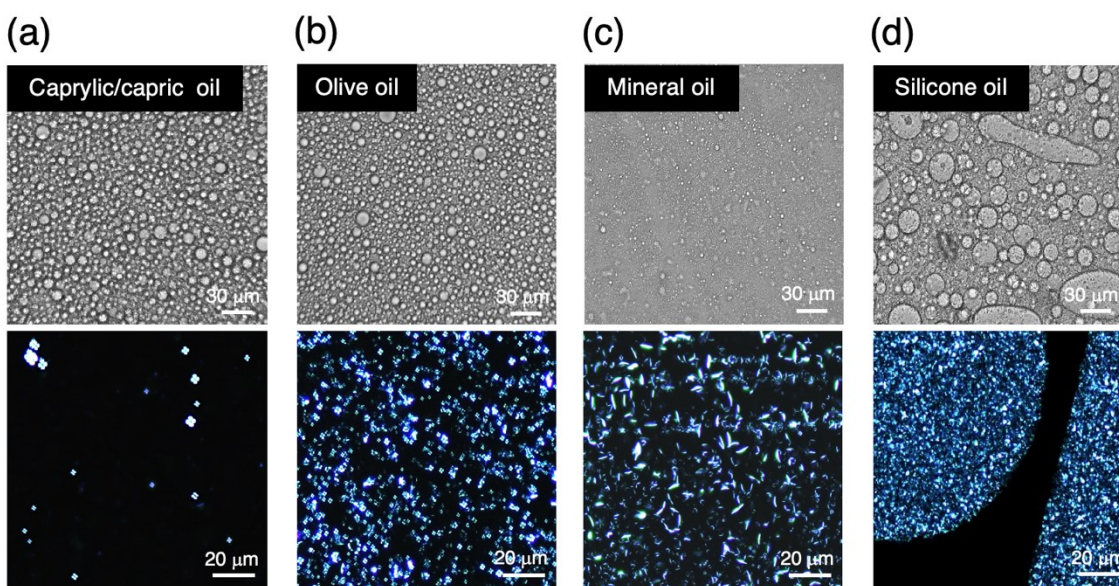
**Figure S2.** Optical microscopic images of intercellular lipid-based Pickering emulsions (ILPEs) at different ratios of IL to HNPs. (a) IL-to-HNPs ratio of 20:1 (w/w), (b) IL-to-HNPs ratio of 30:1 (w/w) and (c) IL-to-HNPs ratio of 40:1 (w/w) to avoid experimental errors due to concentration deviations. Scale bar shows 30  $\mu\text{m}$ .



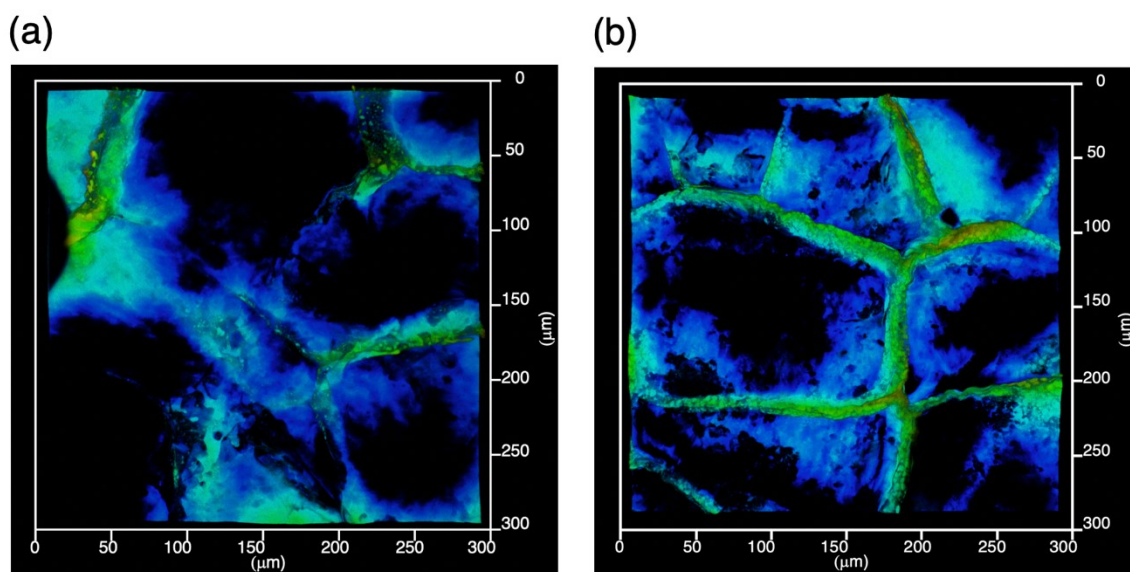
**Figure S3.** Optical microscopic images showing stable spherical micro-sized droplets upon preparation of ILPEs stabilized by (a) hectorite nanoplatelets ( $\text{ILPE}_{\text{HNP}}$ ) and (b) stearic acid ( $\text{ILPE}_{\text{SA}}$ ). Scale bar shows 20  $\mu\text{m}$ .



**Figure S4.** Dispersion stability of ILPEs upon preparation and after one month of storage. (a) ILPE<sub>HNP</sub> (stabilized by hectorite nanoplatelets), (b) ILPE<sub>SA</sub> (stabilized by stearic acid), and (c) ILPE<sub>HNP-SA</sub> (stabilized by hectorite nanoplatelets and stearic acid).



**Figure S5.** Optical microscopy images of emulsion droplets (ILPEs) and polarized microscopy images of IL dispersed in different oils: (a) Caprylic/capric oil, (b) Olive oil, (c) Mineral oil, and (d) Silicone oil. The top row shows optical microscopy images with a scale bar of 30 μm, and the bottom row shows polarized microscopy images with a scale bar of 20 μm.



**Figure S6.** Aerial view of confocal laser scanning microscopy (CLSM) images showing the penetration performance of ILPE-treated porcine skin. (a) ILPE<sub>SA</sub>, and (b) ILPE<sub>HNP-SA</sub>.

## References

1. Cho, Y. S.; Lee, S. H.; Seo, H. M.; Shin, K.; Kang, M. H.; Lee, M.; Park, J.; Kim, J. W. Structuring Pickering Emulsion Interfaces with Bilayered Coacervates of Cellulose Nanofibers and Hectorite Nanoplatelets. *Langmuir* **2021**, *37* (13), 3828–3835.

<https://doi.org/10.1021/acs.langmuir.0c03082>.