

## Supporting Information

### ***Graphene Oxide Membranes with Strong Stability in Aqueous Solutions and Controllable Lamellar Spacing***

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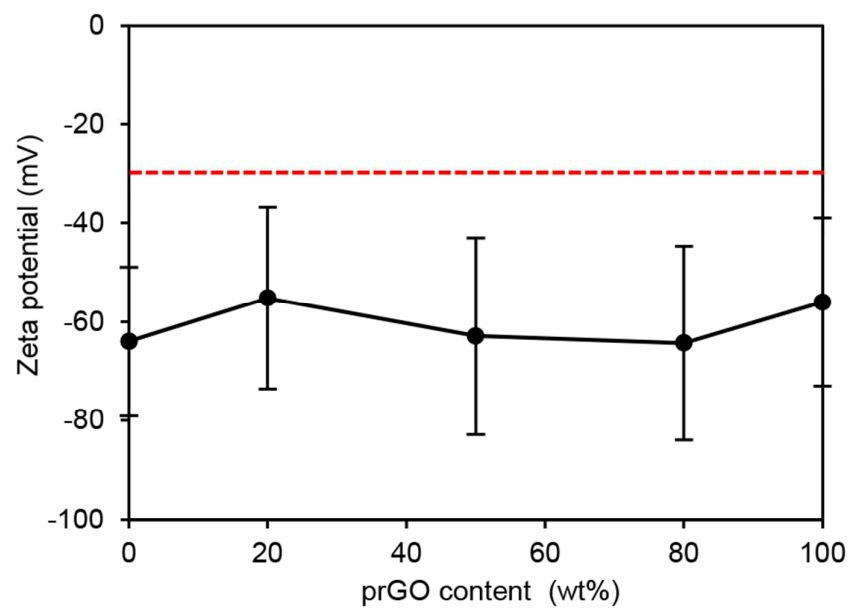
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**Supplementary Figures 1-16**



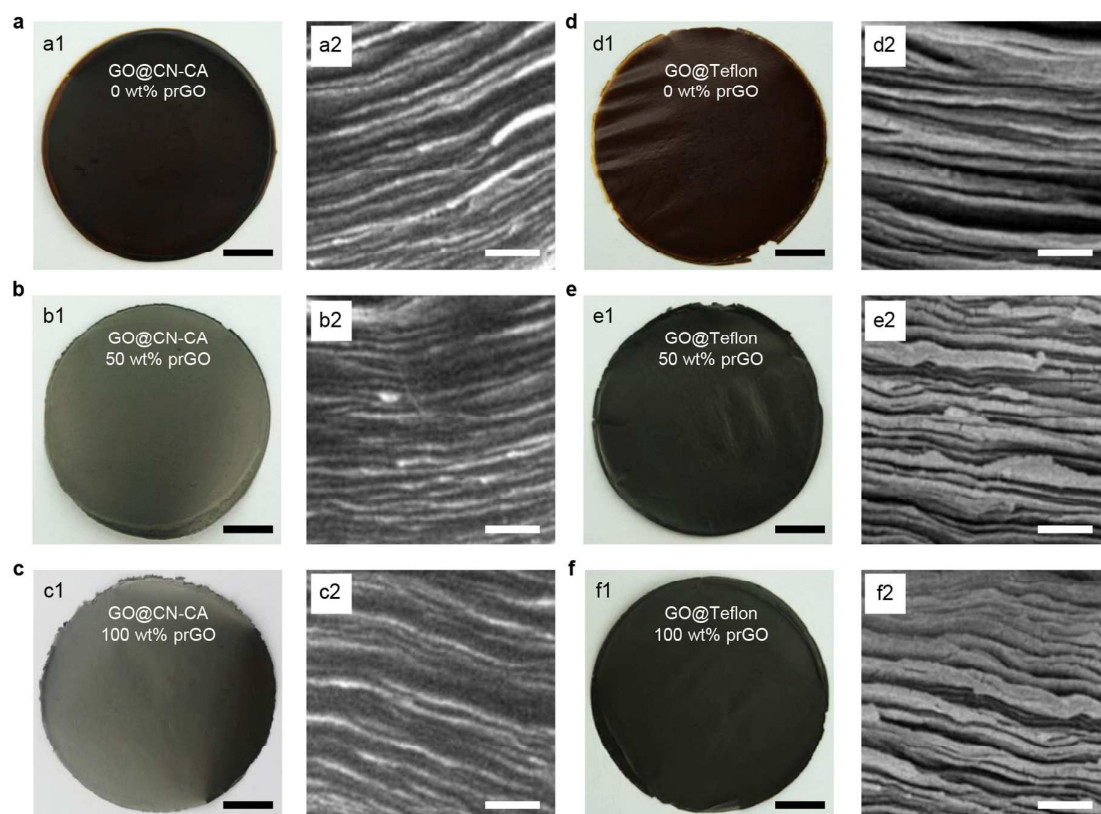
**Figure S1.** The as-prepared GO and prGO sheets are well dispersed in water for a long time.

The concentration of GO or prGO sheets is 0.1 mg/mL.

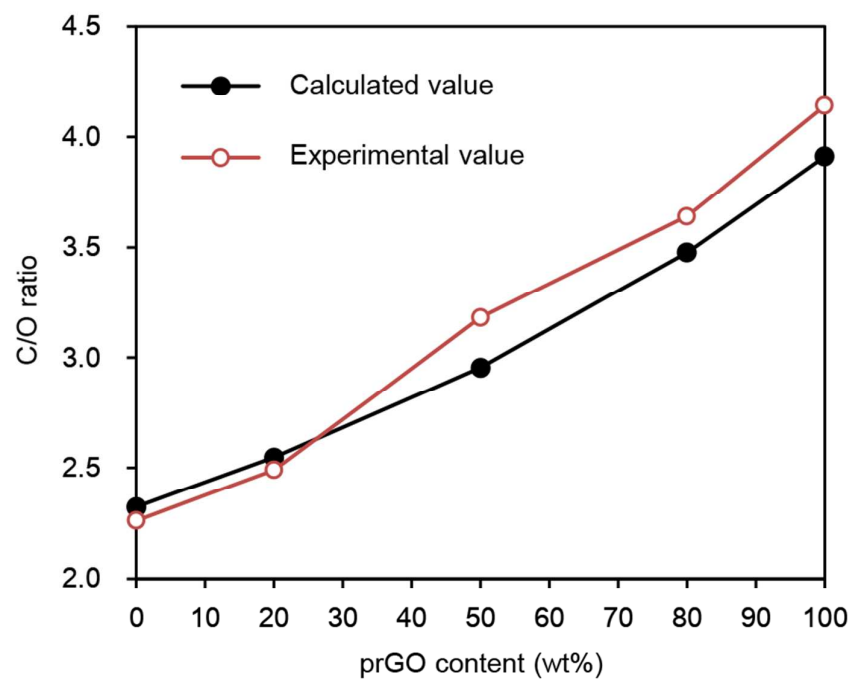


**Figure S2.** Effect of the prGO content on the zeta potential of the mixtures of GO dispersions.

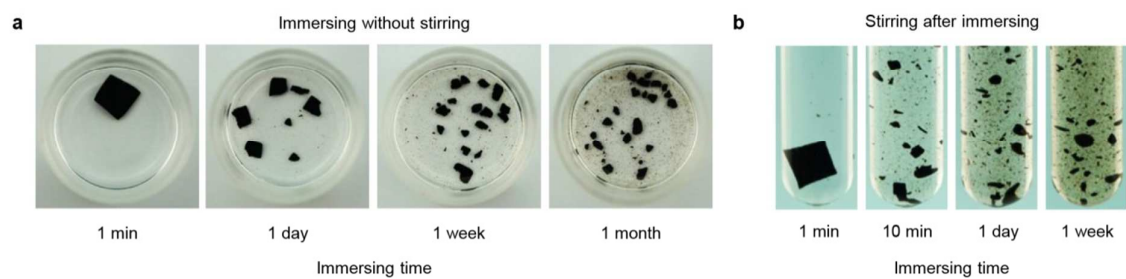
Zeta potential under the red line represents the good stability of GO/prGO solution.



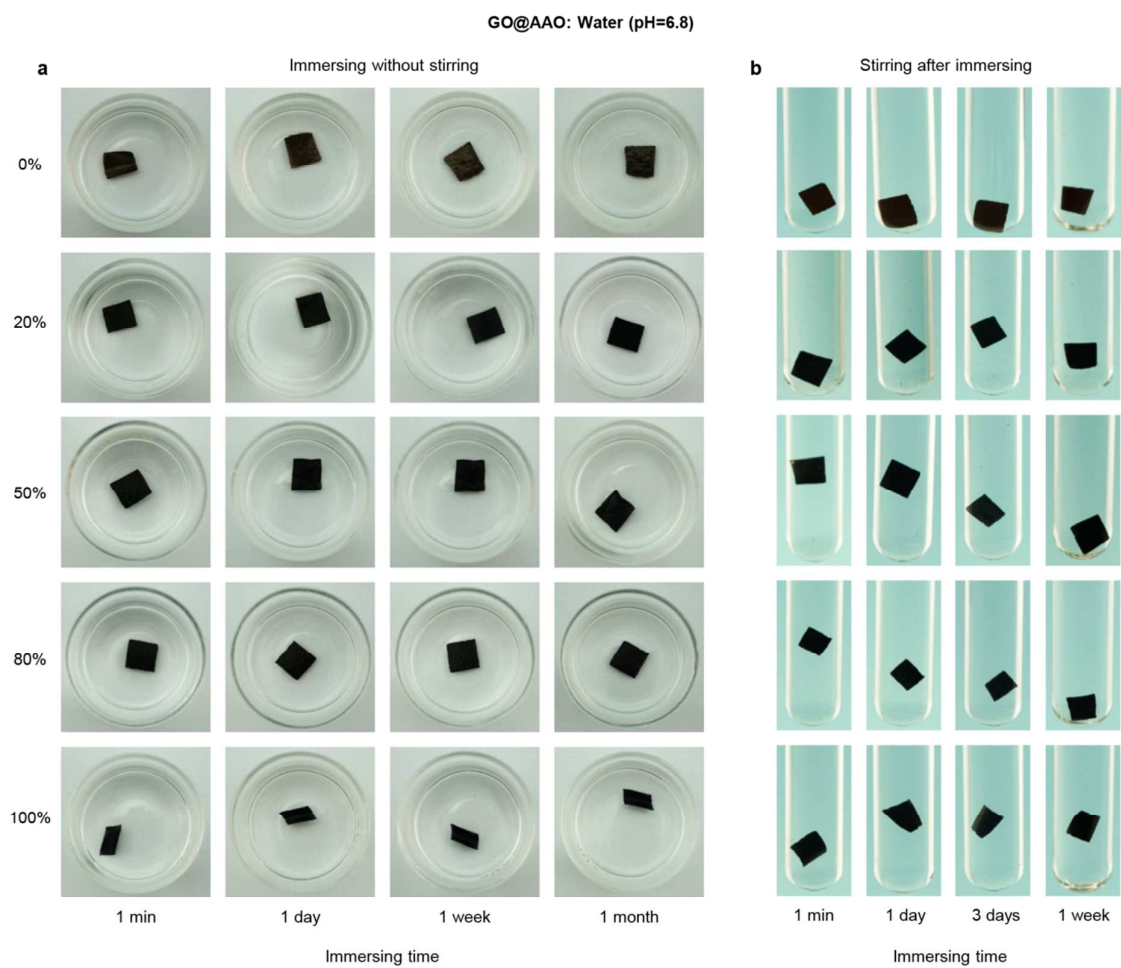
**Figure S3.** Photographs (a1, b1, c1, d1, e1 and f1) and cross-sectional SEM images (a2, b2, c2, d2, e2 and f2) of GO membranes with different contents of prGO that prepared with CN-CA (a-c) and Teflon (d-f) membranes as substrates. The scale bars are 10 mm in (a1, b1, c1, d1, e1 and f1); and 200 nm in (a2, b2, c2, d2, e2 and f2).



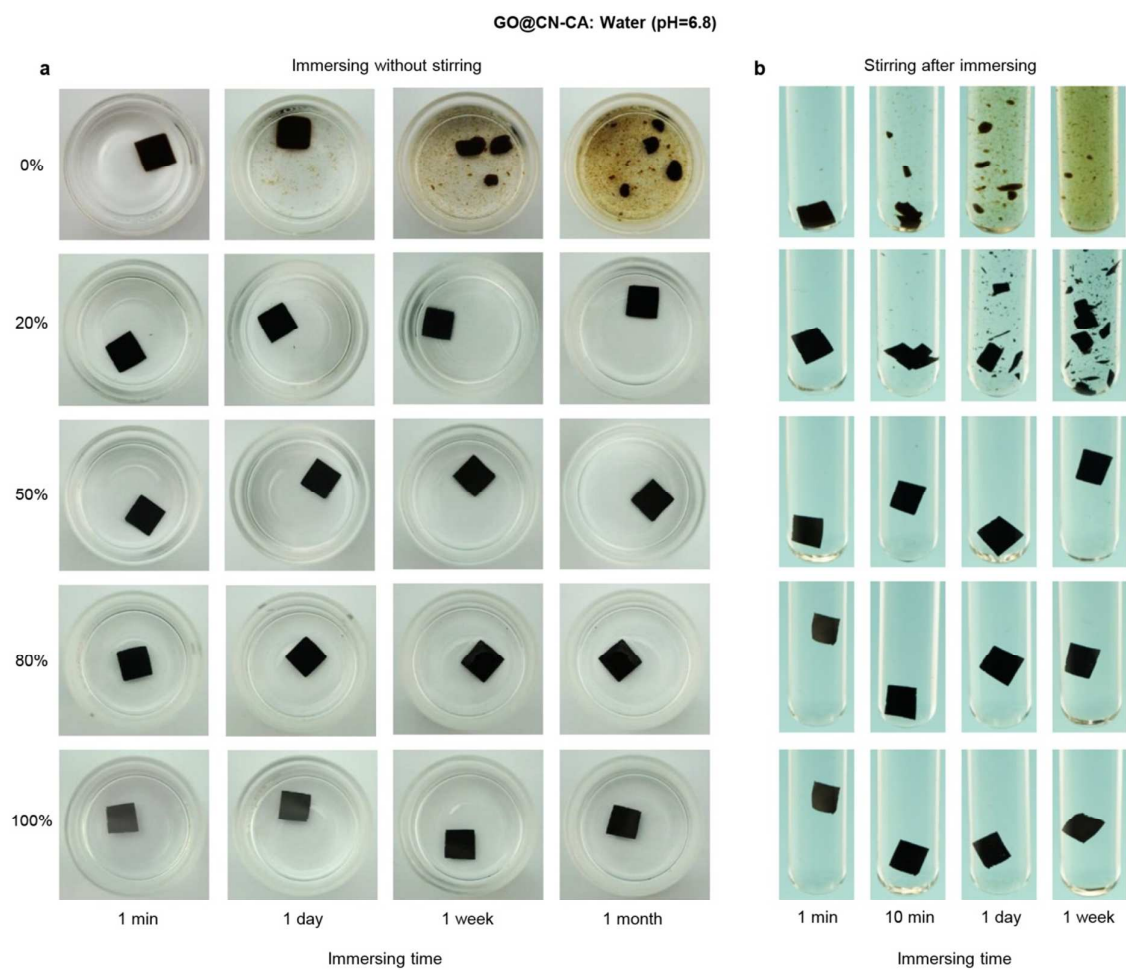
**Figure S4.** Effect of the prGO content on the C/O ratio of GO membranes.



**Figure S5.** Stability of GO@CN-CA membranes without any prGO in ammonium hydroxide solution. (a) Statically immersing without stirring. (b) Stirring after statically immersing.

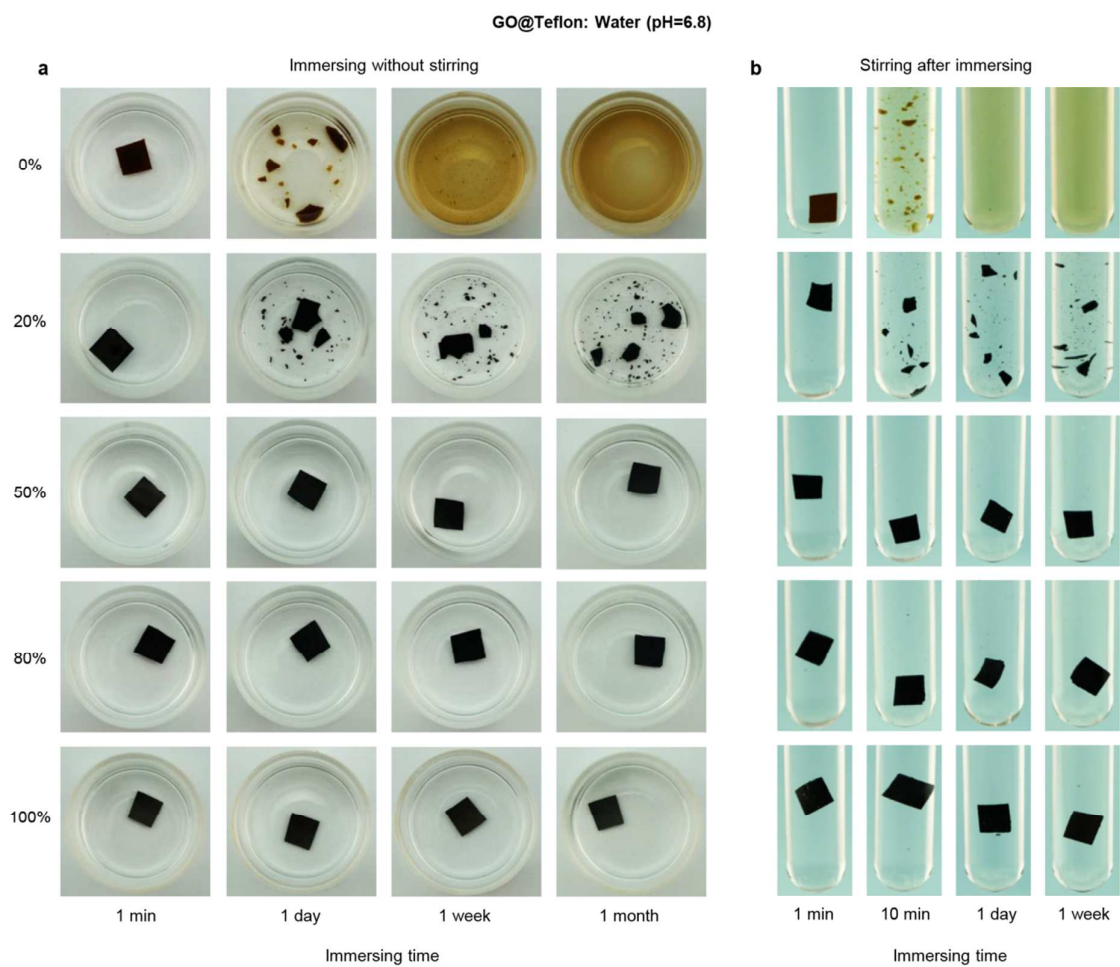


**Figure S6.** Stability of GO@AAO membranes with various contents of prGO in water at pH=6.8. (a) Statically immersing without stirring. (b) Stirring after statically immersing.

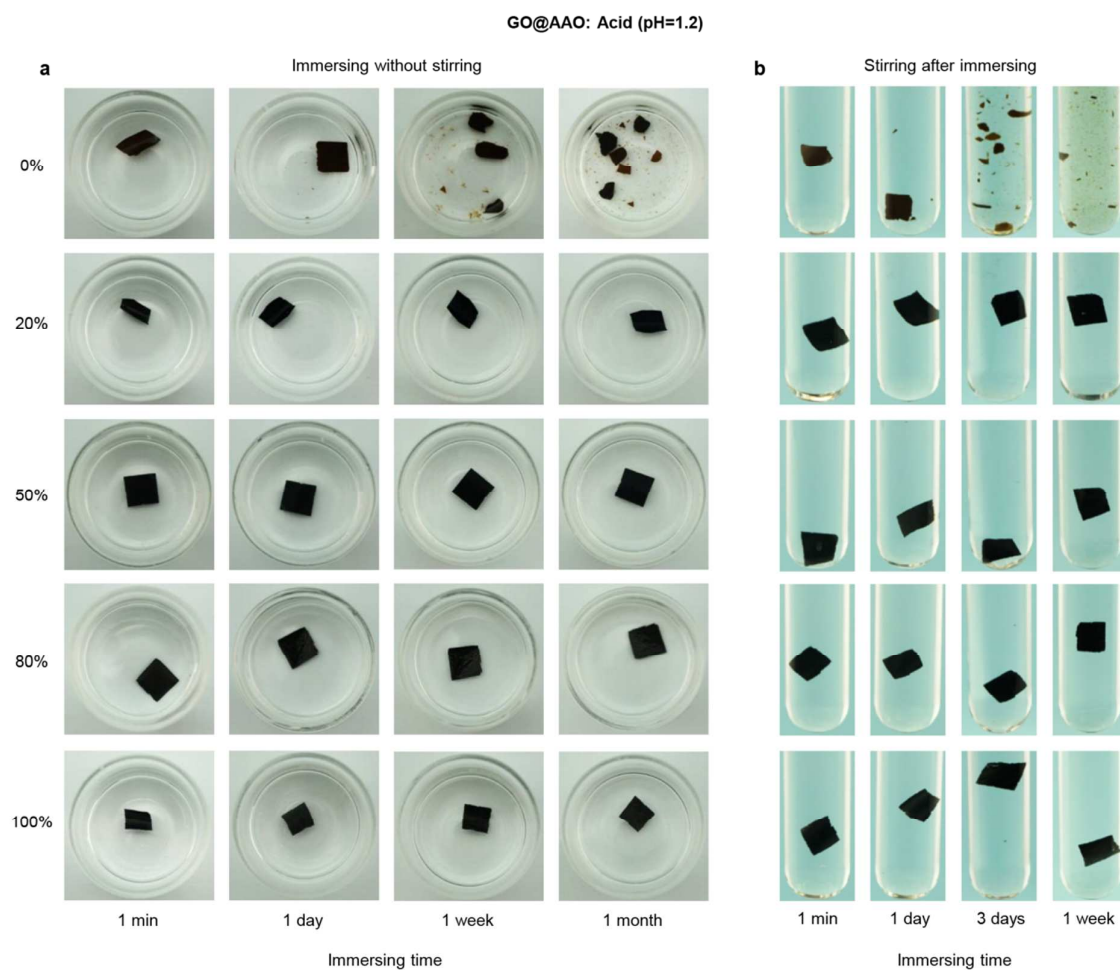


**Figure S7.** Stability of GO@CN-CA membranes with various contents of prGO in water at pH=6.8. (a) Statically immersing without stirring. (b) Stirring after statically immersing.

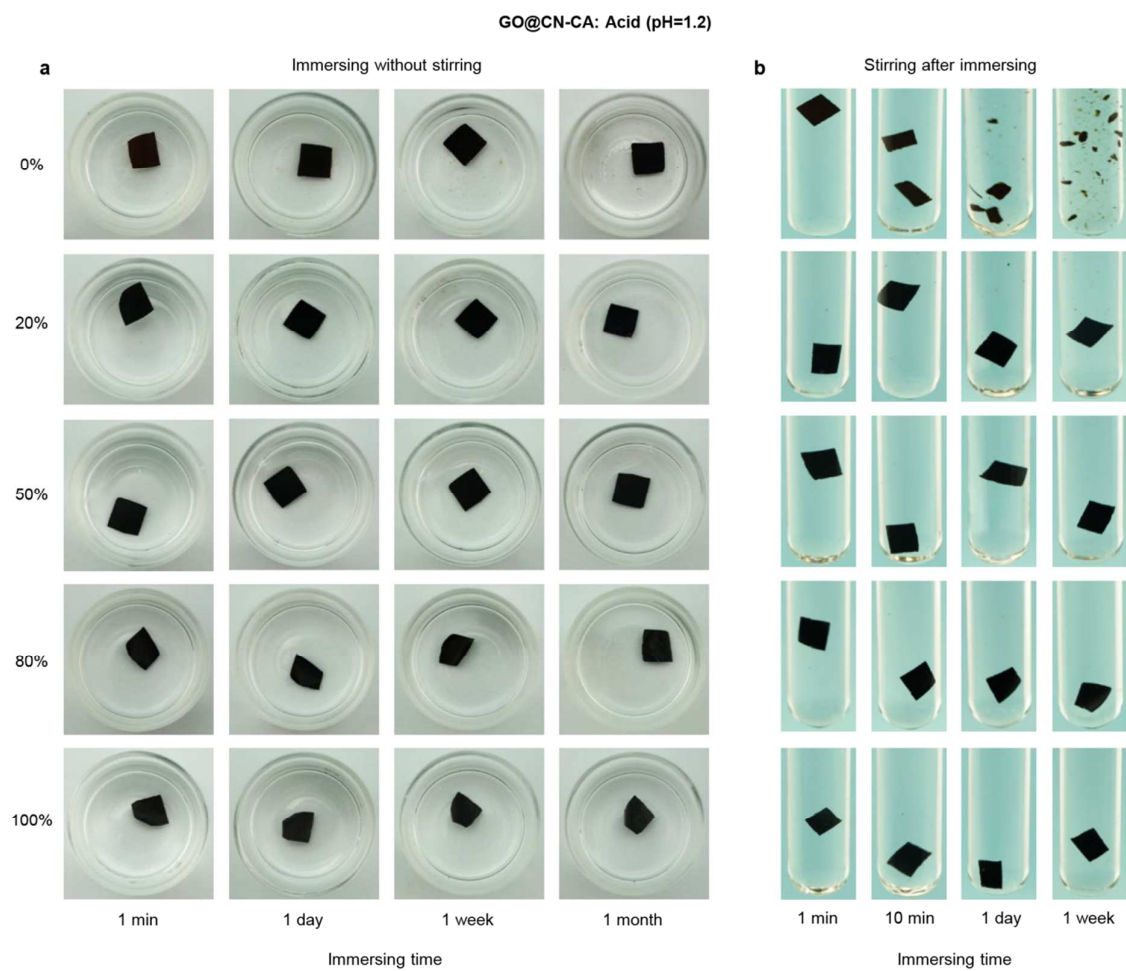




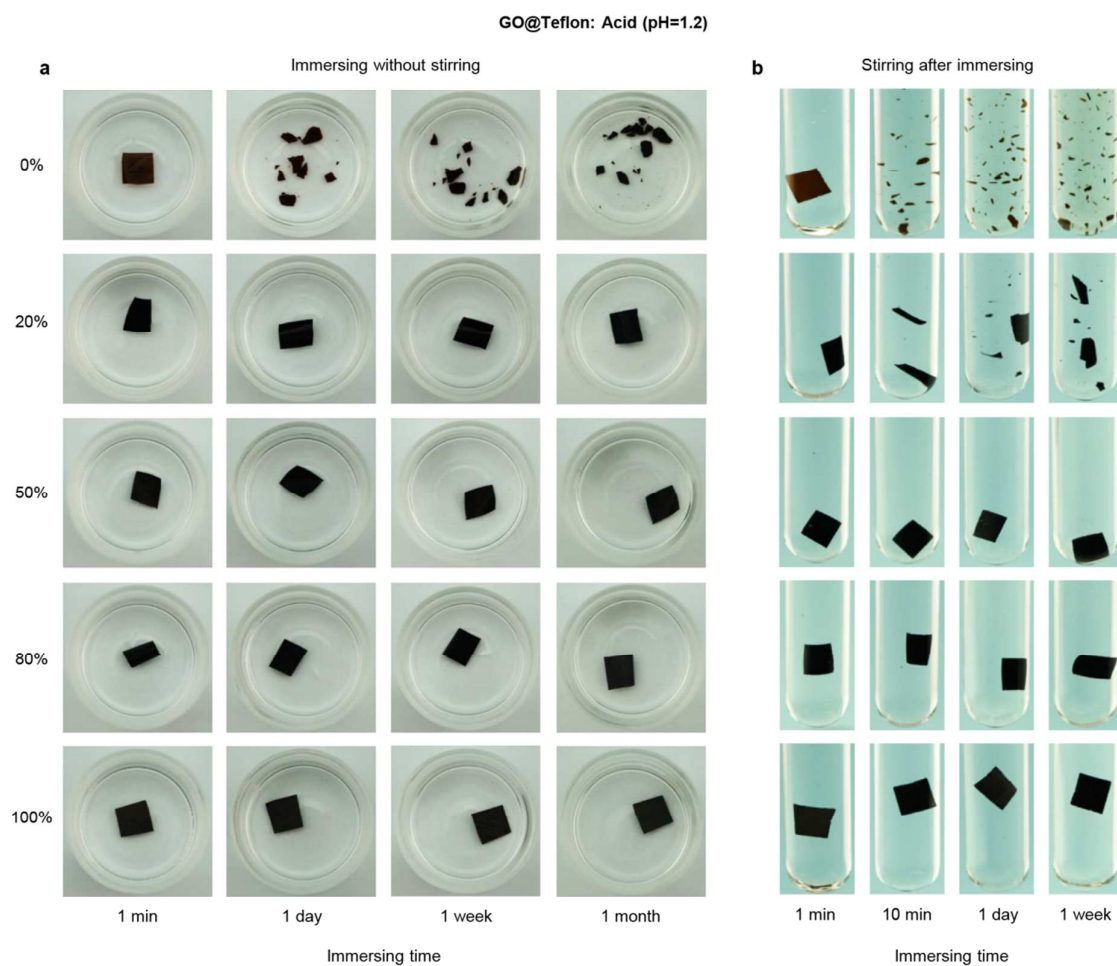
**Figure S8.** Stability of GO@Teflon membranes with various contents of prGO in water at pH=6.8. (a) Statically immersing without stirring. (b) Stirring after statically immersing.



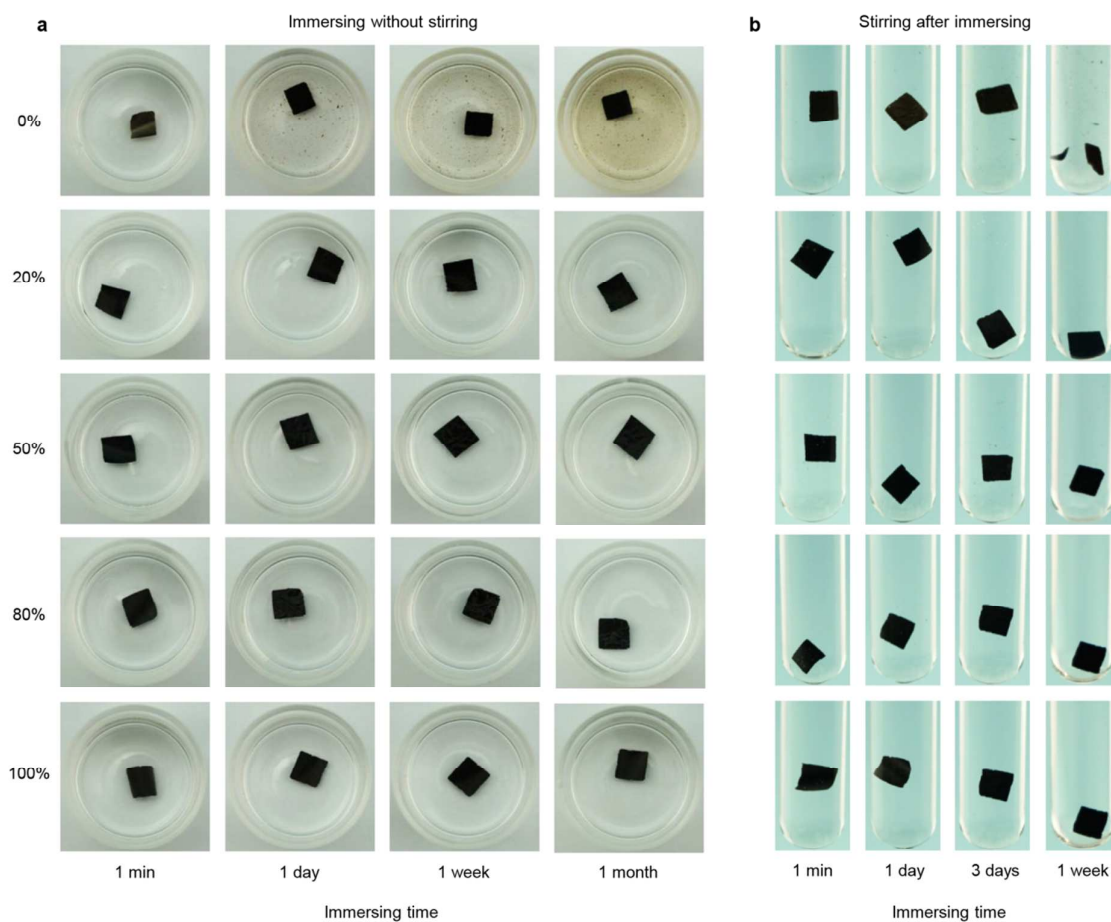
**Figure S9.** Stability of GO@AAO membranes with various contents of prGO in strong acid solution at pH=1.2. (a) Statically immersing without stirring. (b) Stirring after statically immersing.



**Figure S10.** Stability of GO@CN-CA membranes with various contents of prGO in strong acid solution at pH=1.2. (a) Statically immersing without stirring. (b) Stirring after statically immersing.

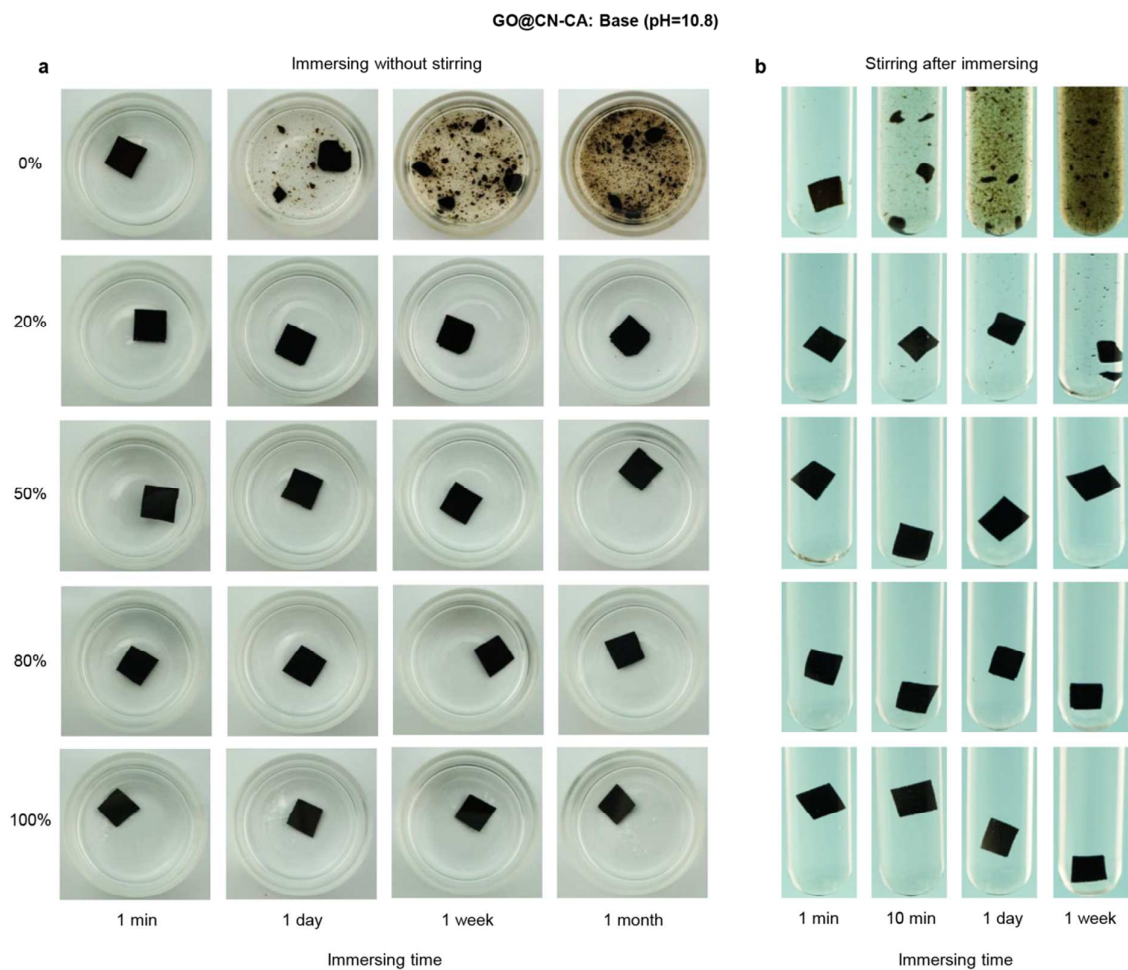


**Figure S11.** Stability of GO@Teflon membranes with various contents of prGO in strong acid solution at pH=1.2. (a) Statically immersing without stirring. (b) Stirring after statically immersing.



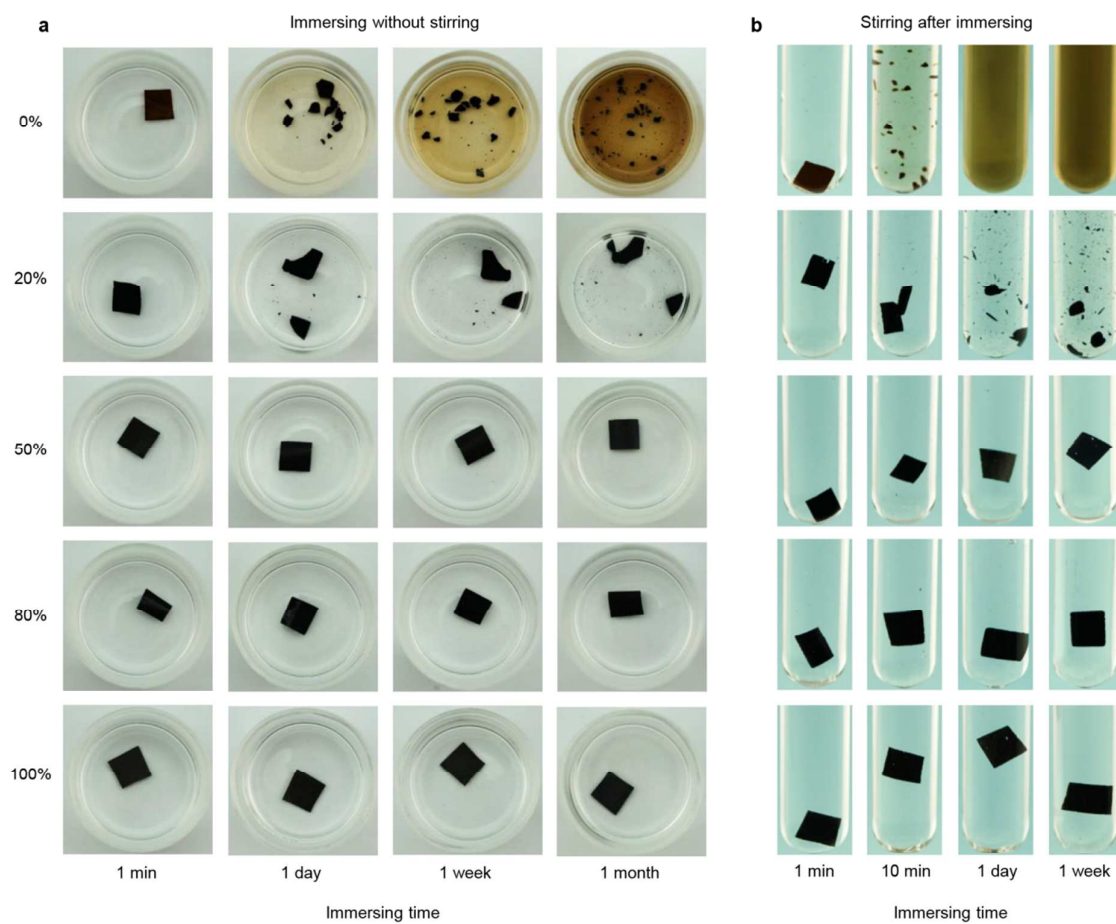
**Figure S12.** Stability of GO@AAO membranes with various contents of prGO in base solution at pH=10.8. (a) Statically immersing without stirring. (b) Stirring after statically immersing.



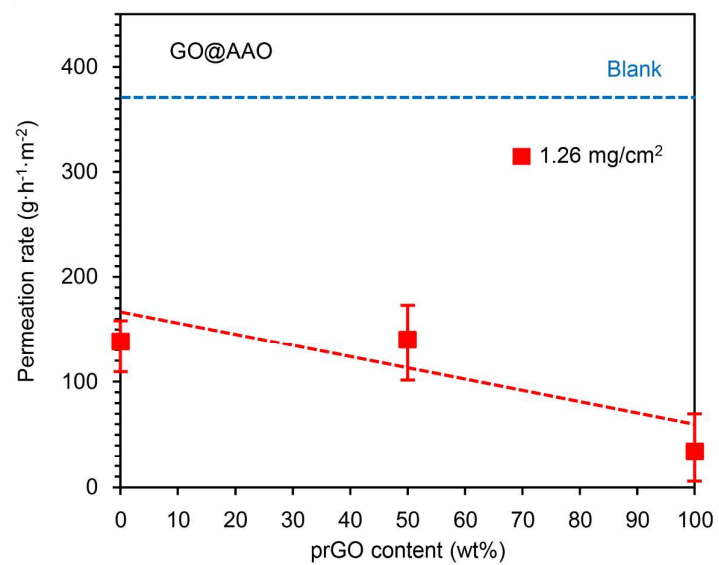


**Figure S13.** Stability of GO@CN-CA membranes with various contents of prGO in base solution at pH=10.8. (a) Statically immersing without stirring. (b) Stirring after statically immersing.

GO@Teflon: Base (pH=10.8)

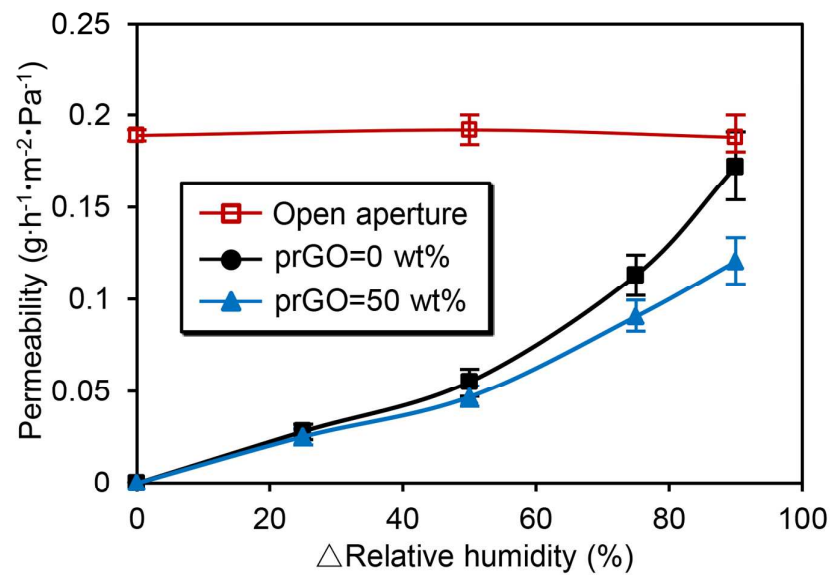


**Figure S14.** Stability of GO@Teflon membranes with various contents of prGO in base solution at pH=10.8. (a) Statically immersing without stirring. (b) Stirring after statically immersing.



**Figure S15.** Effect of the prGO content on the water permeation rate of GO@AAO membranes with various contents of prGO.





**Figure S16.** Water permeability values with different relative humidities through an open aperture and the same aperture covered with GO membranes with different prGO contents. “ $\Delta$ Relative humidity ( $\Delta$ RH)” is the difference of relative humidity between inside and outside the membrane device.

## **Captions for Supplementary Movies 1-9**

**Supplementary Movie 1.** Stability of GO@AAO membranes with 0 wt% and 50 wt% prGO in water under stirring operation after being soaked for certain time periods.

**Supplementary Movie 2.** Stability of GO@AAO membranes with 0 wt% and 50 wt% prGO in acid solution under stirring operation after being soaked for certain time periods.

**Supplementary Movie 3.** Stability of GO@AAO membranes with 0 wt% and 50 wt% prGO in base solution under stirring operation after being soaked for certain time periods.

**Supplementary Movie 4.** Stability of GO@CN-CA membranes with 0 wt% and 50 wt% prGO in water under stirring operation after being soaked for certain time periods.

**Supplementary Movie 5.** Stability of GO@Teflon membranes with 0 wt% and 50 wt% prGO in water under stirring operation after being soaked for certain time periods.

**Supplementary Movie 6.** Stability of GO@CN-CA membranes with 0 wt% and 50 wt% prGO in acid solution under stirring operation after being soaked for certain time periods.

**Supplementary Movie 7.** Stability of GO@CN-CA membranes with 0 wt% and 50 wt% prGO in base solution under stirring operation after being soaked for certain time periods.

**Supplementary Movie 8.** Stability of GO@Teflon membranes with 0 wt% and 50 wt% prGO in acid solution under stirring operation after being soaked for certain time periods.

**Supplementary Movie 9.** Stability of GO@Teflon membranes with 0 wt% and 50 wt% prGO in base solution under stirring operation after being soaked for certain time periods.