

Application of Ionic Liquid to SEM Observation

Ionic liquid (IL) is a kind of salt that stays in a molten state even at room temperature. It does not vaporize in vacuum and facilitates electrical conductivity for observations with a scanning electron microscope (SEM). Substituting IL for water in samples, IL can keep sample morphology without serious deforming, even losing water in the SEM. Following shows observation of reverse osmosis (RO) membrane and kelp using IL. This study was supported by “Mega-ton Water System” in FIRST program.

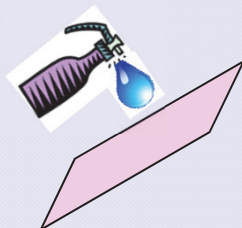
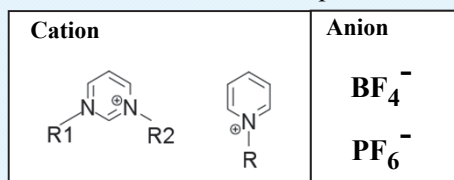
1. The characteristics of Ionic Liquid (IL) and sample preparation using IL.

Ionic liquid is a kind of salt that stays in a molten state even at room temperature.

Characteristics of Ionic Liquid (IL).

1. Low vapor-pressure.
2. Facilitating electrical conductivity.
3. Incombustibility.
4. Exerting various properties by combination of various kinds of ions.

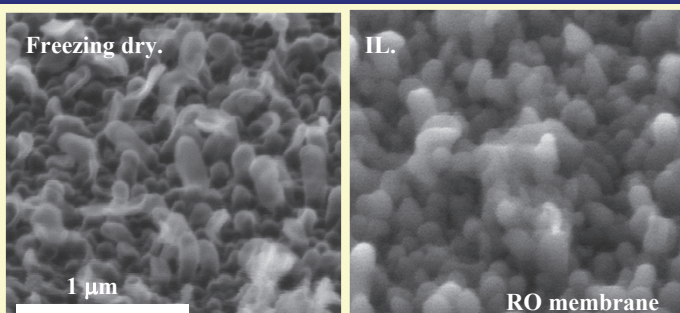
Schema of Ionic Liquid



Sample preparation.

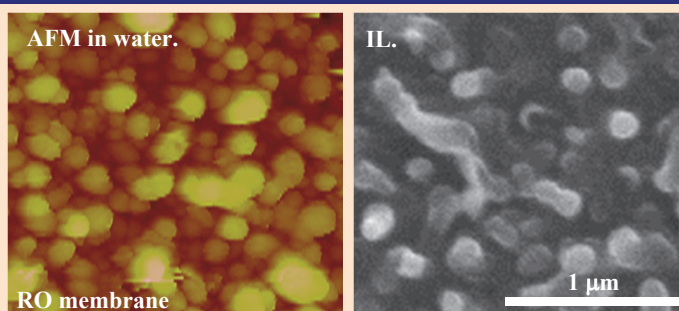
Spraying or dripping IL on the surface of samples.

2. Comparing to freezing dry method



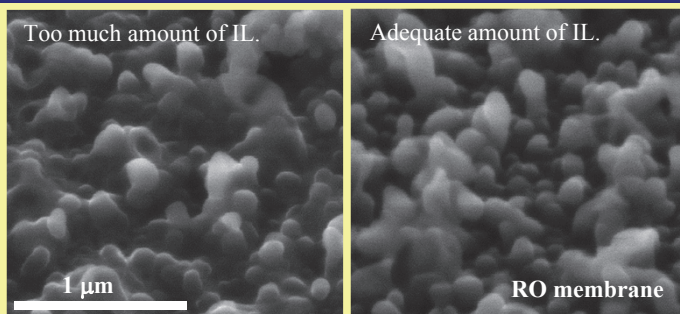
Observing RO membrane. Freezing dry method shrinks sample because of losing water. IL keeps sample morphology as it stays in the water.

3. Comparing to AFM observation in the water



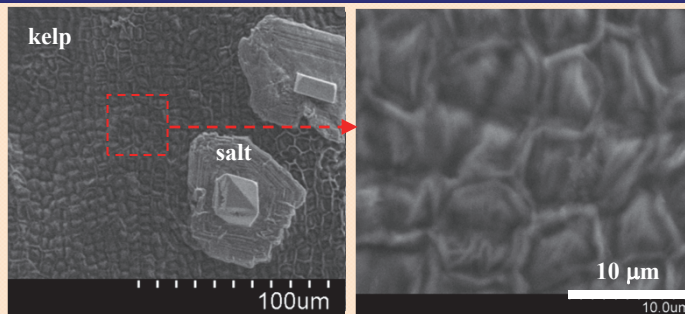
Observing RO membrane. IL method shows similar morphology of AFM. It means IL keeps sample morphology without serious deforming. Furthermore, wide area can be observed using IL.

4. Important point of using IL.



Observing RO membrane. Too much amount of IL covers sample surface and hides fine structures of the sample.

5. Other applications.



Observing kelp using IL. IL prevents deforming of kelp, even decreasing water in kelp.