

SHIRAKASHI LAB.

[Measurement of Bound Water in Biomaterial]

Department of Mechanical and Biofunctional Systems

<http://www.iis.u-tokyo.ac.jp/~aa21150>

Phase Change Thermal Engineering

Mechanical
engineering
department

Hidden water in materials ~bound water~

Hidden water interfering with materials sometime drastically changes the properties and the life-span of host materials. Hidden water is called “*Bound water*”.

The effects of interaction with bound water is critical in biomaterials, since all the biophysiological functions are mediated by water. Detecting dynamics of bound water might tell more about “freshness” and “life-span” of biomaterials.

We are trying to detect “bound water” by the feasible method of dielectric spectroscopy and to associate the dielectric spectra with actual functions of “bound water”, such as desiccation tolerance and frost durability.

- ◆ **Measuring the amount and kinetics of bound water:** Feasible lyoprotectants screening for biopreservation, diagnosis of desiccation tolerance of skin with cosmetics.
- ◆ **Probes for mL and film samples:** Developing the probes enables dielectric spectroscopy of the sample of several tens μL and of several hundreds μm -thickness film.

Measurement of Bound Water



Fig.1 Gelatin gel of various water contents

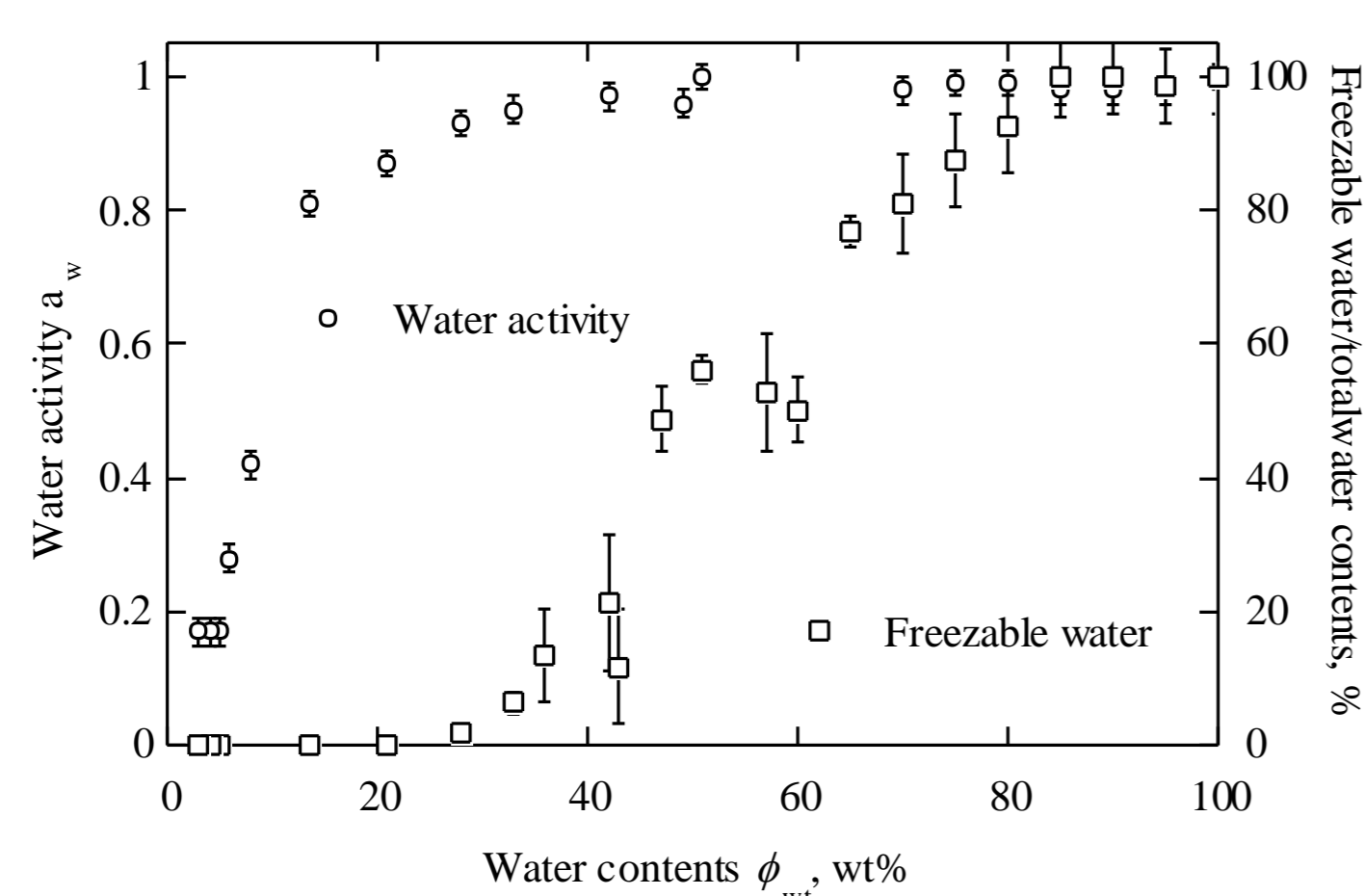


Fig.2 Water activity and freezable water in gelatin gel

Probe Electrodes for Dielectric spectroscopy



Fig.3 Probe for measuring thin film

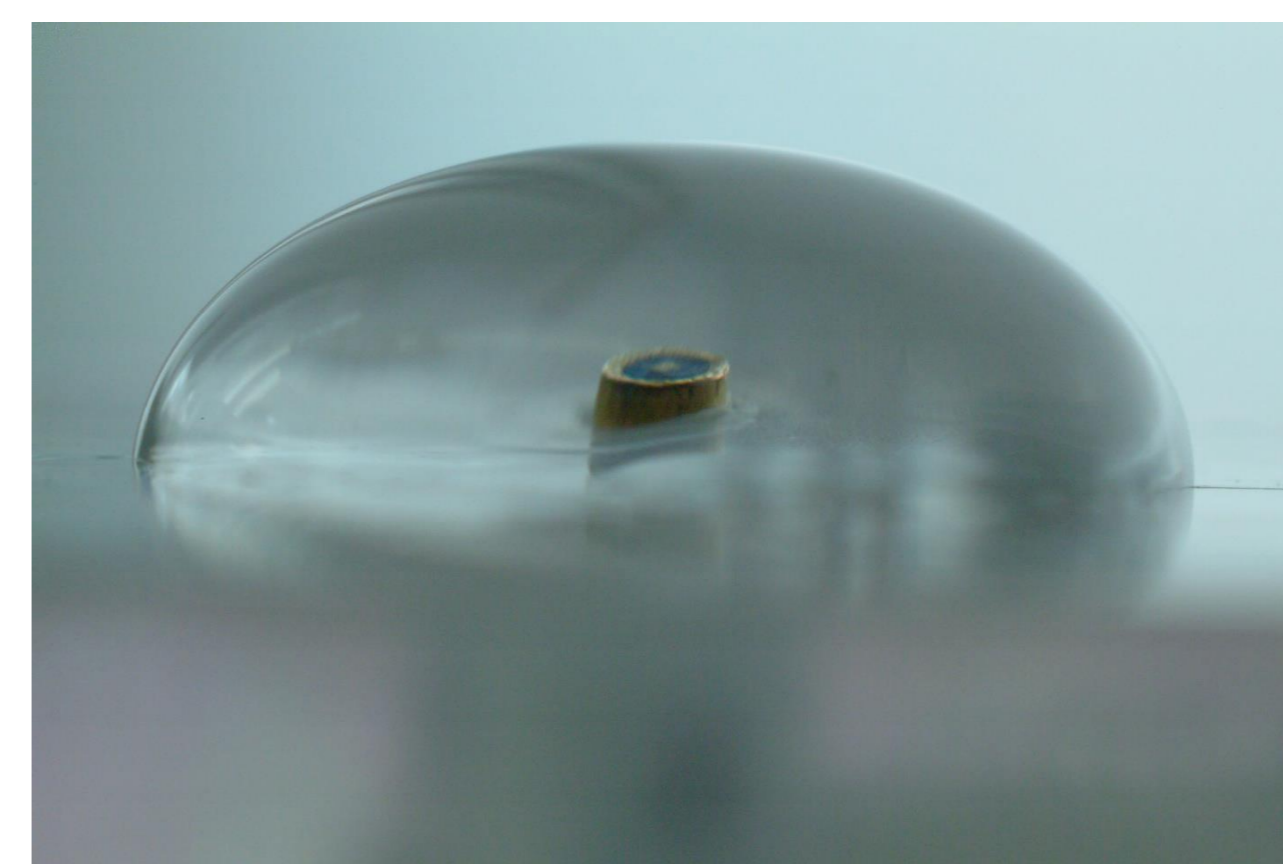


Fig.4 Probe for measuring droplet