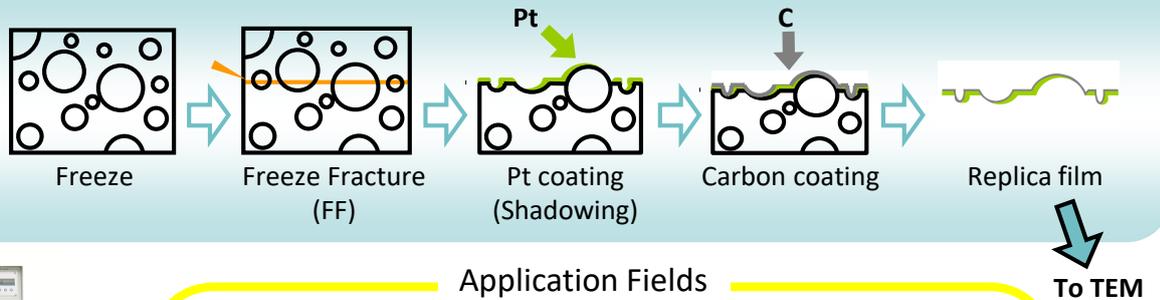


# Freeze-Fracture TEM

## Liposome, Biological Samples, Foods, Health-Care Products...

Freeze-fracture techniques are based on the mechanical fracture of frozen material and the high-resolution metal foil replication of the exposed surfaces. Replication by vapor deposition of platinum and carbon reveals nano-structures of membrane, interface and dispersion state of materials by transmission electron microscopy (TEM) at high resolution.

### Procedure of Freeze-Fracture Replica Transmission Electron Microscopy (FF-TEM)



Freeze-Fracture Apparatus (JEOL JFDII)

### Application Fields

#### Foods

mayonnaise  
cheese  
ice cream  
butter  
chocolate  
food oil

#### Biological samples

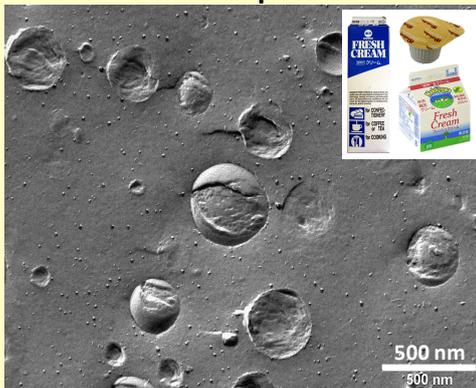
cell  
DNA  
virus  
bacteria  
myosin  
protein

#### Materials

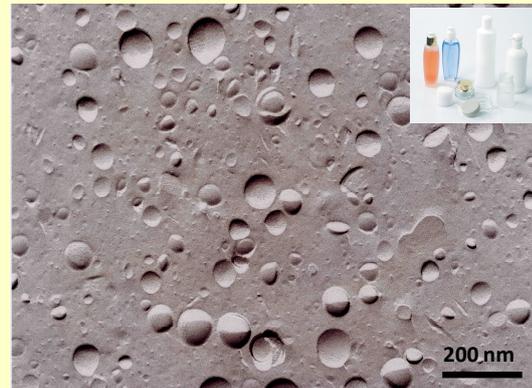
emulsion  
gel  
ink  
pigment  
oil  
liposome

### Applications of Freeze-Fracture Technique

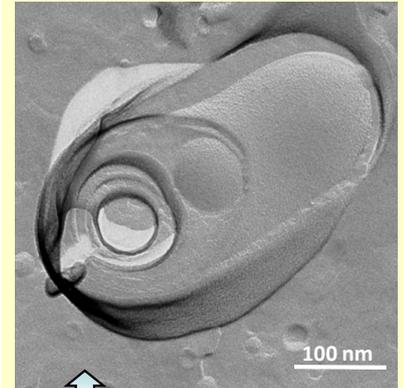
#### Freeze-Fracture Replica TEM



Milk

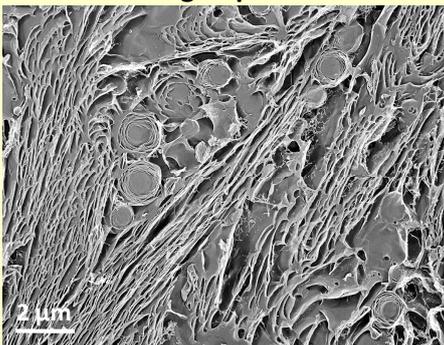


Emulsion



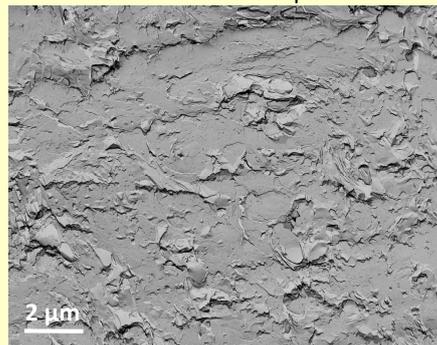
Liposome

#### Freeze-Etching Replica TEM

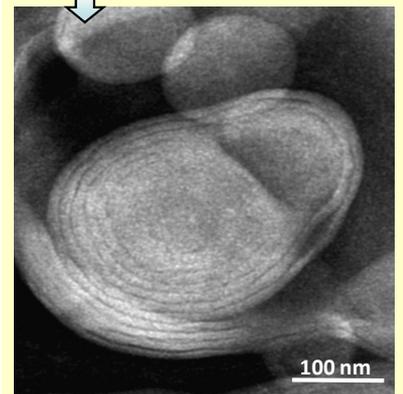


Hair Conditioner

#### Freeze-Fracture Replica



←  
Ice  
sublimation



Liposome (Negatively Stained)