

SEM Sample Preparation

Critical Point Drying Device of SEM Sample Preparation Unit is used for biological samples such as airgel and hydrogel, polymeric materials. SEM imaging of various materials is also provided by drying. Furthermore, non-conductive samples with SEM imaging can be coated with Leica EM ACE600 coating device with gold / palladium (Au / Pd) at desired coating thickness.

Critical Point Drying Leica EM CPD300

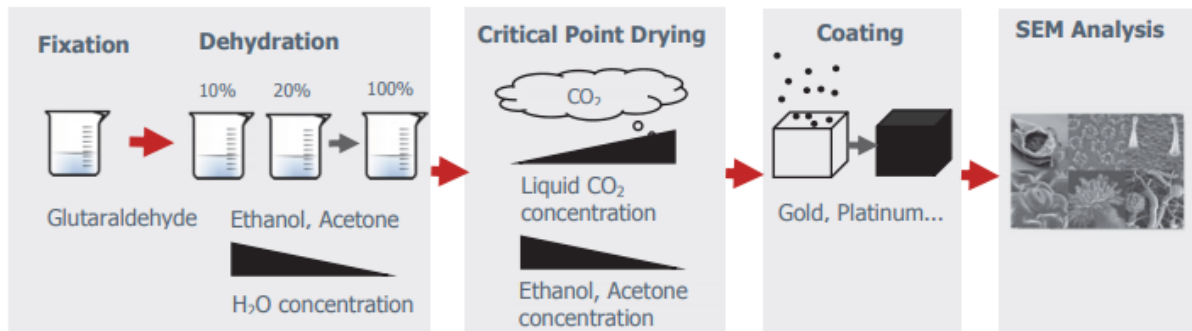
Leica EM CPD300



One of the uses of the Scanning Electron Microscope (SEM) is the study of surface morphology in biological applications which requires the preservation of the surface details of a specimen. Drying of biological samples under room conditions or evaporation could damage the sample morphology. For this reason, critical point drying is the method of sample preparation used in SEM imaging to preserve sample morphology.

Leica EM CPD300 brand Automated Critical Point Dryer is present in our laboratories. There are 4 small sample holders with fine pores (0.5 mm) and a large fine pore sample holder into which they can be placed. The critical point dryer operates on the principle that water in biological samples is replaced by liquid CO₂ under pressure. In this process the support of an interchange liquid such as ethanol or acetone is used. Liquid CO₂ is then passed to the gas phase and the sample is dried. Samples that have been pre-prepared (fixation) are prepared for visualization by automatic critical point dryer following the predetermined appropriate protocol (speed, temperature, number of cycles, etc.) depending on the structure and size of the sample.

Workflow for SEM Analysis: Fixation, Dehydration, Critical Point Drying, Coating, SEM Analysis



Fixation: Cross links proteins to increase mechanical and thermal stability.

Dehydration: Ascending concentration of exchange fluid replaces water in the sample.

CPD: Replacement of exchange fluid by liquid CO₂ (purging) in the sample, and then critical point drying.

Coating: Makes the sample conductive for SEM Analysis.

Device Brand/Model: Leica EM CPD300

Coating Device Leica EM ACE600



The coating device uses argon gas and a small electric field. The sample is placed in a small chamber under vacuum. An electron is removed from argon atoms by means of an electric field to make the argon gas atoms positively charged. Furthermore the ions are drawn into a negatively charged piece of gold-palladium foil. Ar ions act like a grain of sand coming out of a sandblasting machine and strike gold atoms from the foil surface. These gold atoms settle on the sample surface and form a gold coating. 80% Au and 20% Pd target plate with 5 nm - 15 nm thickness surface coating process is done.

Device Brand/Model: Leica EM ACE600