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Aclar Plastic Film

AGL4458, AGL4459

A flexible thermoplastic fluoropolymer film with high optical clarity and a smooth surface.

ACLAR Film provides an oxygen barrier when flat embedding specimens for electron microscopy and light microscopy. It separates easily from epoxy and is chemically inert.

Macrophages selectively adhere to its surface, lymphocytes do not. ACLAR film (discs), as substrates in standard tissue culture, after washing, can produce an almost pure collection of macrophages. Discs can then be fixed, dehydrated, critical point dried and attached to
SEM specimen mounts.

For HRP studies, ACLAR film is helpful for LM evaluation, prior to thin sectioning. After processing through HRP, fixation and dehydration series and embedding procedure schedules, one can place a slice of tissue sample with a drop of epoxy resin on a small piece of ACLAR. Place another piece of ACLAR on top and press between two pieces of glass. Polymerize in the oven. When polymerized, ACLAR peels off easily to reveal a thin plate of embedded tissue which is conveniently examined under the light microscope.

The 1968 paper (1) by E. B. Masurovsky and R.P. Bunge was the first to describe and clearly demonstrate the useful chemical and physical properties of ACLAR® for both tissue culture and electron microscopic purposes. It was first used in the space program and its properties were found to be interesting for biomedical research (personal communication, Dr. E. Masurovsky). Subsequent work by others developed ACLAR®'s applications; attention is brought to that done by Mawe, et al (2), and the comprehensive ACLAR® study by Kingsley and Cole (3).

ACLAR® overcomes a number of problems regarding the processing of tissue culture cells, epoxy embedments, sectioning and observations because of its chemical inertness, non-stick property, glass clarity, flexibility and smooth surface. It may be cut with scissors or blades and does not damage microtomy knives. It is unsurpassed in moisture barrier protection, transparent to UV and is plasticizer and stabilizer free. It is nonflammable, non-aging and has a low dielectric constant and dissipation. It is high in dielectric strength. ACLAR® can be sterilized.

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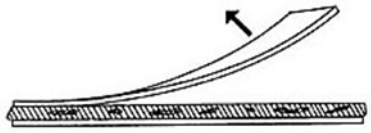
Features of ACLAR® Film:

- Separates easily from epoxy
- Transparent fluorinated-chlorinated thermoplastic which contains no volatile components
- Chemically inert, for all practical purposes, ideal for growing cell cultures
- Cells adhere to it readily and remain attached after fixation, dehydration and critical point drying or embedding
- Accepts heavy metal sputter coating
- Stable in the scanning electron microscope: melting point 202°C
- ACLAR® is as transparent as glass
- Fluorescence microscopy possible since ACLAR® exhibits no detectable autofluorescence
- Can be sectioned and does not damage ultramicrotomy knives
- Considerably simplifies the preparation of cultured cells for all types of microscopies
- Sterilizable
- Gives flat sections
- Soft, can be sectioned
- Smooth surface makes light microscopy observations possible
- Does not degrade under UV or gamma ray radiation
- Used as an O_2 barrier when flat embedding methacrylate or acrylic resins

Epoxy embedments sandwiched between ACLAR® sheets


ACLAR® pulled away from the flat specimen embedment.

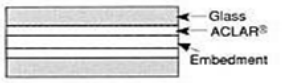

Cut out the area of interest and glue it on a 00 cylinder for sectioning.

References, ACLAR® Film

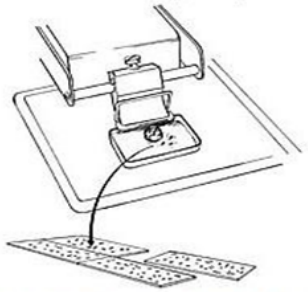
1. Masurovsky EB, Bunge RP: Fluoroplastic coverslips for long-term nerve tissue culture. Stain Technology, 43, 3, 161-165 (1968)

2. Mawe GM, Bresnahan JC, Beattie, MS: Ultrastructure of HRP-labelled neurons:
a comparison of two sensitive techniques. Brain Research Bulletin, 10, 551 (1983)

3. Kingsley RE, Cole NL: Preparation of cultured mammalian cells for transmission and scanning electron microscopy using Aclar film. J of Electron Microscopy Technique, 10, 77-85 (1988)



Press between glass plates


Fresh material is cut on a Vibratome®, treated with HRP and placed on ACLAR cut into a slide shape - observe under LM - if OK, process for TEM on the slide.

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Disc punches are available in 4 sizes:

- 5/16" (7.9mm)
- 3/8" (9.5mm)
- 7/16" (11.1mm)
- 1/2" (12.7mm)

For comparative TEM and SEM procedures, cut an ACLAR circle in half and compare the two after fixation (Kingsley3), use a blunt needle to mark.

Physical Data

Density	2.21g/cm^3
Thickness	7.8 mil (0.198mm) and 2.0 mil (0.0508mm)
Clarity	Clear
Water absorption	Nil
Water Vapor Transmission Rate @ 100°F (37.7°C)	0.003gm / 100in^2 / day (0.047gm / m^2 / day)
Dimensional Stability, 10 min @ 300°F (149°C)	≤ 2%
Dimensional Change, 10 min @ 300°F (149°C)	< 2%
Thermal Conductivity	4.7 x 10-4 cal-cm/cm^{2}sec°C
Crystalline Melting Point	395.6 - 399.2°F (202 - 204°C)
Flammability	Nonflammable

Chemical Resistance Data

Acetone	No effect
100% Ethyl Alcohol	No effect
Liquid Nitrogen	Remains flexible
Osmium Tetroxide	No effect
Propylene Oxide	No effect
Butyl Alcohol	None
Carbon Tetrachloride	Slightly flexible
1,2-Dichloroethane	None
Ethyl Acetate	Very flexible
Ethyl Ether	Very flexible
Ethylene Oxide	Very flexible
Formic Acid	None
Gasoline	None

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All Acids (HCl, H_2SO_4)	None
Methanol	None
Toluene	Slightly flexible
Plastisolve	None