

Durcupan ACM

#SI14040

Araldite Base Embedding Agent for Electron Microscopy

Araldite casting resin M, hardener grade 964, accelerator grade 964, and dibutyl phthalate, the components required for the Araldite embedding procedures as described in the Literature are sold by us under the description Durcupan ACM.

Mixtures of Durcupan ACM present an interesting alternative to methacrylates for embedding sections for electron microscopy. They present the advantage that they harden uniformly, practically without shrinkage.

All fixing agents normally used for electron microscopic work are also suitable for the Durcupan ACM embedding process. This process consists of three phases: dehydration of the tissue with acetone or ethyl alcohol (1), infiltration with the embedding agent, followed by hardening.

The following two resin mixtures have been found suitable in practice:

No. 1 Durcupan ACM mixture:

Proportion in the mixture	Component	Identification color (bottle cap and label)	Product
10 ml	A/M	Red	Epoxy resin
10 ml	B	Blue	964 hardener
0.1-0.2 ml	D	Green	Dibutyl phthalate (2)

No. 2 Durcupan ACM mixture:

10 ml	A/M	Red	Epoxy resin
10 ml	B	Blue	964 hardener
0.3-0.4 ml	C	Yellow	964 accelerator
0.1-0.2 ml	D	Green	Dibutyl phthalate (2)

These two mixtures are preferably prepared at least 15 minutes before use, and kept during this period in the drying cupboard at 50°C (122°F), so that they are thoroughly mixed. Glass apparatus used for measuring and mixing should be placed in acetone or absolute ethyl alcohol immediately after use and cleaned.

- (1) Durcupan ACM mixtures are not so easily soluble in ethyl alcohol as in acetone.
(2) This reduces the brittleness of the blocks and improves their cutting properties.

Basic scheme for dehydration and embedding in Durcupan ACM

The tissues are dehydrated, after they have been fixed in buffered osmic acid (osmium tetroxide) or in any other fixing agent normally used for electron microscopy.

Normal dehydration stage:

No. 1 tray	30% acetone (3)	15 minutes	With materials containing only very little water it is permissible to start directly with No. 2 tray
No. 2 tray	50% acetone (3)	30 minutes	
No. 3 tray	70% acetone (3,4)	30 minutes	This period may also be extended, e.g., during lunch time or overnight.
No. 4 tray	90% acetone (3)	30 minutes	
No. 5 tray	Dry acetone (3)	30 minutes	Dry acetone is stored over dried copper sulfate.
No. 6 tray	Dry acetone (3)	30 minutes	

Normal infiltration stage:

No. 7 tray	3 parts dry acetone (3) 1 part of No. 1 Durcupan ACM mixture	1 hour	at room temperature
No. 8 tray	2 parts of dry acetone(3) 2 parts of No. 1 Durcupan ACM mixture	1 hour	at room temperature
No. 9 tray	1 part dry acetone (3) 3 parts of No. 1 Durcupan ACM mixture	1 hour	at room temperature (this period may also be extended, during lunch time or overnight)
No.10 tray	No. 1 Durcupan ACM mixture	1-2 hours	at 50°C (122°F) in the drying cupboard
No. 11 tray	No. 1 Durcupan ACM mixture	1-2 hours	at 50°C (122°F) in the drying cupboard
No. 12 tray	No. 2 Durcupan ACM	1-2 hours	at 50°C (122 degrees F) in the drying cupboard

(3) Instead of acetone, ethyl alcohol of the same concentration may be used.

(4) Aqueous solutions of the more common contrasting agents can be added to No. 3 tray.

Normal hardening stage:

Take the pieces of tissue from No 12 tray and place them in dry gelatin capsules, which are then filled with No 2 Durcupan ACM Mixture (from the storage vessel). After closing the capsules, harden them in the drying cupboard at 50-80°C (122-176°F) for at least 48 hours.

In this way blocks of a pale golden color are obtained, of hardness similar for that of methacrylate, with good cutting properties. If contrasting is required and this has not been carried out during dehydration (No. 3 tray), let the sections float on a heavy metal salt solution. Unlike methacrylate, hardened Durcupan ACM cannot be dissolved out of the sections by applying gentler media.

For details as regards dehydration, embedding, hardening and cutting refer to the book of Daniel C. Pease, *Histological Techniques for Electron Microscopy*, Academic Press Inc., New York and London, 1960 (pp. 78-85).

Caution

Take great care when working with Durcupan ACM: Do not breathe in the vapor and avoid skin contact, because this may cause skin irritation and allergic reactions. Splashes on the skin must be washed off immediately with a 3% boric acid solution. Frequent washing of hands, arms, and face with lukewarm soap water is advisable.

Retail Packages

Set packages:

Durcupan ACM is sold in set packages for making 1 litre of embedding mixture.

Separate components:

The four components can also be purchased separately. They are supplied only in bottles of 100ml each, so that they can be stored longer.

Contents of set package for 1 liter of embedding mixture:

Component	Identification color	Product	Quantity
A/M	Red	Epoxy resin	5x 100 ml
B	Blue	964 Hardener (anhydride of a dicarboxylic acid with aliphatic side chain)	5x 100 ml
C	Yellow	964 accelerator (phenol derivative with amino group)	1x 100 ml
D	Green	Plasticiser (dibutyl phthalate-Fluka)	1x 100 ml

Separate components:

A/M	Bottle of 100 ml each
B	Bottle of 100 ml each
C	Bottle of 100 ml each
D	Bottle of 100 ml each