Embedding Formulations

In this section, some commonly used embedding media are listed.
We refer to the composition of the original reference. Variations can be done in dependence on the specimen under study. Hardness of a block can be manipulated by changing the relation between monomer and crosslinker (hardener) and/or by the addition of plasticisers.

1) Glycid ether 100 (EPON 812)

Glycid ether 100 (formerly known as EPON 812) is one of the most widely used embedding media. Sections of this resin show greater contrast in the electron microscope than that shown by comparable Araldite sections. However, the inherent granularity of Glycid ether 100 may limit high magnification and high resolution.

Glycid ether cured with Dodecenylsuccinic anhydride (DDSA) alone will result in rather soft blocks, whereas Methylnadic anhydride (MNA) yields very hard blocks. The method of Luft uses 2 different stock solutions A and B. By using varying proportions of the 2 mixtures, blocks of the desired hardness can be produced.

Mixture A		**Mixture B**	
Glycid ether 100	62 ml	Glycid ether 100	100 ml
DDSA	100 ml	MNA	89 ml

These mixtures are stable for 6 months, if stored under argon at -20 ℃.

Mixture A	**Mixture B ml**	**DMP-30 ml**	**Relative hardness ml**
10	0	0.15	very soft
7	3	0.15	soft
5	5	0.15	medium
3	7	0.15	hard
0	10	0.15	very hard

Polymerisation:
20 h at 45 ℃ and then at 60 ℃ for again 24 h.

Due to the fact that the epoxide content of Glycid ether 100 may vary from lot to lot, it may be difficult to prepare blocks of reproducible hardness. To circumvent this problem, Burke and Geiselman developed a method of calculating the correct proportions of Glycid ether 100, DDSA and MNA to use with any particular batch of resin; they provide a table listing these proportions for any particular WPE (weight per epoxide, epoxide equivalent).
(See also Hayat, 1989)

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2) ERL 4221 D (SPURR-Mixture)

In the original formulation by Spurr, ERL-4206 was used which is no more available, due to its high toxicity. It is replaced by the cycloaliphatic epoxy resin ERL-4221 D and can be used in the same concentrations as described by Spurr.

This resin is characterized by its very low viscosity which facilitates rapid penetration into tissues. It is often used for plant and bone tissue.

Ingredients (g)	**Standard**	**Modifications**			
	A	**B**	**C**	**D**	**E**
ERL 4221	10.0	10.0	10.0	10.0	10.0
D.E.R. 736	6.0	4.0	8.0	6.0	6.0
NSA	26.0	26.0	26.0	26.0	26.0
DMAE	0.4	0.4	0.4	1.0	0.2
Total weight	42.4	40.4	44.4	43.0	42.2
Polymerisation time (h) at 70 ℃	8	8	8	3	16
Hardness	firm	hard	soft	1)	2)
Pot life (d)	3 - 4	3 - 4	3 - 4	2	7

1) Modification D results in shorter pot life, rapid cures and higher viscosity
2) Modification E yields longer pot life and lower viscosity

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3) ARALDITE Embedding

Araldites are glycerol-based aromatic epoxy resins which show very little volume shrinkage after polymerisation.Compared with ERL-4221 D and Glycid ether 100, they have a rather high viscosity. Compared with other epoxy resins, Araldite seems to be less grainy at very high resolution.

Mixture according to Glauert (1958)	
Araldite CY 212	10 ml
Araldite HY 964 (DDSA) (hardener)	10 ml
Araldite DY 964 (DMP-30) (Accelerator)	0.5 ml
Dibutyl phthalate	1.0 ml
Mixture according to Luft (1961)	
Araldite 502[1)]	27 ml
DDSA	23 ml
DMP-30	0.75 - 1 ml
Mixture according to Mollenhauer (1964)	
Araldite 502[1)]	15 ml
Glycid ether 100	25 ml
DDSA	55 ml
Dibutyl phthalate	2-4 ml
DMP-30	1.5 %
or BDMA	3 %

Polymerisation can be done at 60 ℃ for 24 h.
1) Araldite 502 can be replaced by Araldite CY 212

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