PMMA Resist

Poly(methyl methacrylate) (PMMA) is the most popular e-beam resist, offering very high-resolution, ease of handling, excellent film characteristics, and wide process latitude.

Characteristics:

- Positive tone
- Very high resolution
- Poor dry etch resistance
- No shelf life or film life issues
- Not sensitive to white light
- Developer mixtures can be adjusted to control contrast and profile

Resist available at TNFC	950k PMMA A3
Storage	10-27 ºC
Surface Preparation	In general, no surface preparation aside from normal cleaning is necessary. Good adhesion to most surfaces.
Spin	Speed 1000-5000 rpm, 60 sec. (100-300 nm)
Pre-bake	180°C hotplate, 1 min., >15 min if used as a mask for wet etch. May also be oven baked at 170°C for 30 min.
Expose	Dose around 1000 μC/cm^2 at 100 kV.
Develop	MIBK:IPA 1:3, 1-2 minute
Rinse	IPA, 30 sec
Dry	By dry N_2
Post-Bake	Not normally necessary. Flow can begin at as low as 120°C. Does not seem to noticeably improve adhesion or etch resistance.
Descum	Light! PMMA etches very fast in oxygen. In an oxygen plasma asher, times can be around 1 minute, but beware! Do not preheat the PMMA. Removal rates increase dramatically with temperature.
Stripping	Most solvents, including acetone and methylene chloride will strip PMMA, as will NMP (Remover 1165). It is removed very well by strong bases (KOH), and by acid normally hostile to organics, such as NanoStrip. Oxygen plasmas etch PMMA very well.

Link to PMMA manufacturer’s data sheet:

https://kayakuam.com//wp-content/uploads/2019/09/PMMA_Data_Sheet.pdf