

HOW TO MAKE POLYPROPYLENE μ -BEAM CELL DISHES

Introduction

Specially prepared dishes are used for cell irradiations at the Columbia microbeam. These dishes are made from standard 60 mm bacterial Petri dishes that have a 0.25 inch diameter hole drilled into their centers. The hole is covered by a 3.9 μm thick piece of polypropylene glued to the outer surface of the bottom of the dish. When viewed from the top, the hole and the polypropylene film form a well in which cells can be grown. Shortcuts in this procedure should be avoided as the results may be unfavorable. If the epoxy is not properly cured, toxic residues may form which can prevent cells from growing or injure them in such ways to make any experimental results ambiguous.

Preparation

- Falcon 60 mm bacterial Petri dishes (1007) are acquired and a 0.25 inch diameter hole is drilled into the center of the dish bottom. This step is performed by the gentlemen at the Center for Radiological Research Machine Shop.
- Sand the outside surface of the dish bottom lightly (600 grit paper) around the hole to enhance glue attachment.
- Master Bond EP30MED two-component epoxy is mixed at the ratio of four parts component A to one part component B by weight on a 100 mm plastic Petri dish or lid. As this ratio is critical, components should be weighed to the nearest milligram and a minimum of 5g should be prepared for each use. The epoxy is then stirred for 5 min. with a microscope slide to mix the components thoroughly. Poor mixing also can lead to incomplete curing.
- The epoxy is then spread onto the dish bottoms by means of a roller¹. Polypropylene squares are cut from the stock spool. The surface of the polypropylene that was electron-gun treated to enhance attachment is placed in contact with the epoxy (for the wide roll of polypropylene at RARAF, this is the outside surface; for the narrow rolls of polypropylene, this is the inside surface).
- The glued dish is then baked at 90° C. Important: Dishes exposed to temperatures higher than 90° C will warp or melt!
- Any slackness in the polypropylene surface may be tightened by carefully heating the surface with a heat gun until it stretches tightly across the hole.
- The dishes may be sterilized by soaking them in 70% ethanol for 30 min. Dishes are removed from the alcohol inside a clean bench and stood up inside sterile 100 mm Petri dishes until dry (1-1.5 hours) and then stored within the 100 mm dishes.

¹ A roller assembly can be made from a piece of 1/8" diameter rod bent in the shape of a "7" with the long arm as a handle and a 1" long piece of Tygon tubing pushed onto a similar length piece of 1/8" i.d. metal tubing as the roller (dimensions can be modified).