

	Transmission (TEM) & Scanning (SEM) & Scanning Transmission (STEM)	Cryo-Scanning (Cryo-SEM) & (Cryo-STEM)	Graphene Liquid Cell Electron Microscopy (GLC-EM)
<b>USED FOR:</b>	Biological	Biological	Biological (that cannot withstand a vacuum)
<b>PREP PRIOR TO</b>	“Purification” and possible staining	“Purification”, <b>Negative stain</b> (*see below) and/or Crosslinking solution ( <b>glycerol or sucrose solution</b> )	
<b>FIXING</b>	Chemical - to cross link proteins to other molecules	Cryo - Rapid freezing (prep is -4C, -90C for sectioning)	None
<b>Chemicals used</b>	<b>Aldehydes</b> (common one used is gluteraldehyde); Familiar one is Formaldehyde. <b>Acrolein</b> <b>Tannic Acid</b>	<b>Liquid Helium</b> <b>Liquid Nitrogen</b>	
<b>RINSING (needed for reducing acidity bc of fixing)</b>	<b>sodium cacodylate</b>	X	
<b>SECONDARY FIXING</b>	To further stabilize the the tinier structures in the specimens and Lipids	X	
<b>Chemicals used</b>	<b>Osmium tetroxide OsO4</b> <b>Potassiumferrocyanide.</b> <b>Picric acid (for osmium-free fixing)</b>		
<b>DEHYDRATION</b>	Removes the water and replaces it with solvent	X	NONE
<b>Chemicals used</b>	<b>Ethanol</b> or <b>Acetone</b> followed by <b>Hexamethyldisilazane (HMDS)</b> or liquid <b>CO2</b>		
<b>INFILTRATION</b>	For slicing and polymerization (60C), overnight	X	Liquid mediums containing gold or other metal nanoparticles for “labeling”.
<b>Chemicals used</b>	<b>Propylene oxide</b> <b>Epon</b> or <b>Epon-Araldite</b> <b>Acetone</b> <b>Acrylic Resin</b>		Metals like <b>GOLD</b> ; Fluorescent quantum dot nanoparticles
<b>STAINING (negative)</b>	Biological samples usually need staining for contrast (creating dark particles on a light background)	Done prior to Fixing (freezing)	
<b>STAINING (positive)</b>	Biological samples are stained to see contrast (light particles on a dark background)		
<b>Chemicals used</b>	<b>Uranium</b> (uranyl acetate, uranyl formate) <b>Lead</b> (lead citrate, Lead hydroxide) <b>Tungsten</b> (phosphotungstic acid) <b>Molybdenum</b> (Ammonium Molybdate) <b>Osmium</b> (osmium ferricyanide, osmium tetroxide) <b>Gold</b> (auroglucothionate)		
<b>SPURRING</b>	X	Vapor shadowing to help with contrast	
<b>Chemicals used</b>		<b>platinum</b> <b>gold</b> <b>carbon</b>	