

MMA Oddy Test Methods; Updated December 2021													
Oddy Method Number	Cu source; purity	Ag source; purity	Pb source; purity	Rinse Method	Holder Type	O-ring Type	Water Volume	Coupon Sanding	Sand Paper Grit	Coupon Configuration	Component Wash Method	Lid Tightening	Extra Notes
20211201_OT	Fine Metal, high purity; 99.998+	Fine Metals; 99.998%	Alfa Aesar, high purity; 99.998%	all coupons rinsed with HPLC acetone and HPLC isopropanol	Water-jet cut Stainless Steel from Asterisk Inc	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic and stainless steel only water wash	4 Nm torque	
20191213_B_OT	Thermo/Alfa Aesar/Fine Metals, high purity; 99.998+	Fine Metals; 99.998%	Alfa Aesar, high purity; 99.998%	all coupons rinsed with HPLC acetone and HPLC isopropanol	none	Viton (black)	0.5 mL	lead	3200 grit	half-sized coupons touching the material	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20190606_OT	Thermo/Alfa Aesar/Fine Metals, high purity; 99.998+	Fine Metals; 99.998%	Alfa Aesar, high purity; 99.998+	all coupons rinsed with HPLC acetone and HPLC isopropanol	Stainless steel holder (SS type 304). Laser cut by Jerry Lui at Printzworld. 0.4mm thick with SHAPEWAYS nylon nested inside after clipping 'wings' and coupon rail. Coupon hung from stainless.	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20190425_OT	Thermo/Alfa Aesar/Fine Metals, high purity; 99.998+	Fine Metals; 99.998%	Alfa Aesar, high purity; 99.998+	all coupons rinsed with HPLC acetone and HPLC isopropanol	Stainless steel holder (SS type 304). Laser cut by Jerry Lui at Printzworld. 0.4mm thick	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20190321_OT_a	Thermo/Alfa Aesar/Fine Metals, high purity; 99.998+	Fine Metals; 99.998%	Alfa Aesar, high purity; 99.998+	all coupons rinsed with HPLC acetone and HPLC isopropanol	Stainless steel holder (SS type unknown). Waterjet produced by Meer Precision. 0.6mm thick	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20190318_OT_b	Alfa Aesar, high purity; 99.998%	Fine Metals; 99.998%	Alfa Aesar, high purity; 99.998%	all coupons rinsed with HPLC acetone and HPLC isopropanol	A & B are used, permanent, washed holders. Unclear whether they'd yellowed from storing for many months on 60C oven. All Ultimaker polypropylene holders (Met printed)	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20190318_OT_a	Alfa Aesar, high purity; 99.998%	Fine Metals; 99.998%	Alfa Aesar, high purity; 99.998%	all coupons rinsed with HPLC acetone and HPLC isopropanol	A is NEW nylon holder. B is a used, permanent, washed holder that had yellowed from storing for many months on 60C oven. All Ultimaker polypropylene holders (Met printed)	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20190226_OT_1	Alfa Aesar, high purity; 99.998%; sourced from Fine Metals – smooth non-striated surface with occasionally 'problematic spotting' impurities on surface. Fine Metals is supplying Alfa Aesar and either source will work.	Fine Metals; 99.998%	Alfa Aesar, high purity; 99.998%	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways nylon holders	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20190226_OT	Alfa Aesar, high purity; 99.998%; sourced from Fine Metals – smooth non-striated surface with 'problematic spotting' impurities on surface	Fine Metals; 99.998%	Alfa Aesar, high purity; 99.998%	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways nylon holders	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20190130_OT	Alfa Aesar, high purity; 99.998%	Fine Metals; 99.998%	Alfa Aesar, high purity; 99.998%	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways nylon holders	NA	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	NA	Oddy coupons crimped onto Shapeways nylon holders, placed in sealed pouch with kimax water vial and heat sealed into barrier foil package for testing. Coupons were placed vertically with Shapeways holder on floor of ~125mL 4-sided pyramidal pouch. Original, Cut-out was 8.5" x 8.5". Seals were approx 1/2" wide.
20190115	Alfa Aesar, high purity; 99.998%	Fine Metals; 99.998%	Alfa Aesar, high purity; 99.998%	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways design of nylon coupon holder but without the vertical bars; open configuration	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20181203_C_OT	NA	NA	NA	NA	Shapeways nylon holders	Viton (black)	0.5 mL	NA	NA	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20181203_B_OT	NA	NA	NA	NA	Shapeways nylon holders	Viton (black)	0.5 mL	NA	NA	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20181203_A_OT	NA	NA	NA	NA	Shapeways nylon holders	Viton (black)	0.5 mL	NA	NA	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20181031_OT	Alfa Aesar, high purity; 99.998%	Fine Metals; 99.998%	Alfa Aesar, high purity; 99.998%	all coupons rinsed with HPLC acetone and HPLC isopropanol	Ultimaker polypropylene holders (Met printed)	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20180821_OT	Alfa Aesar, high purity; 99.998%	Fine Metals; 99.998%	Alfa Aesar, high purity; 99.998%	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways nylon holders	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20180821_B_OT	Alfa Aesar, high purity; 99.998%	Fine Metals; 99.998%	Alfa Aesar, high purity; 99.998%	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways nylon holders	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	Hanging coupons & half-sized coupons touching the material.
20180706_OT	Fine Metals; 99.998%; unannealed	Alfa Aesar, high purity; 99.998%	Alfa Aesar, high purity; 99.998%	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways nylon holders	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	A: coupons in holder; B: half-sized coupons on material
20180706_C_OT	Fine Metals; 99.998%; unannealed	Fine Metals; 99.998%	Alfa Aesar, high purity; 99.998%	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways nylon holders	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20180706_B_OT	Fine Metals; 99.998%; unannealed	Fine Metals; 99.998%	Alfa Aesar, high purity; 99.998%	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways nylon holders	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	A: coupons in holder B: coupons in holder & half-sized coupons on material
20180704_OT	Fine Metals; 99.998%, unannealed	Fine Metals; 99.998%, unannealed	Alfa Aesar, high purity; 99.998%	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways nylon holders	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20180628_OT	Fine Metals; 99.998%; unannealed	Alfa Aesar, high purity	Alfa Aesar, high purity	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways nylon holders	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	A: new and washed nylon holders; B:used, passing, and washed nylon holders
20180628_B_OT	Fine Metals; 99.998%; unannealed	Alfa Aesar, high purity; 99.998%	Alfa Aesar, high purity; 99.998%	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways nylon holders	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	A: coupons in holder; B: half-sized coupons on material
20180626_OT	Fine Metals; 99.998%; unannealed	Alfa Aesar, high purity	Alfa Aesar, high purity	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways nylon holders	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	coupons in holder and half-sized coupons on material
20180626_B_OT	Fine Metals; 99.998%; unannealed	Alfa Aesar, high purity	Alfa Aesar, high purity	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways nylon holders	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	half-sized coupons on material
20180614_OT	Fine Metals; 99.998%; unannealed	Alfa Aesar, high purity	Alfa Aesar, high purity	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways nylon holders	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20180525_OT	Fine Metals; 99.998%	Alfa Aesar, high purity	Alfa Aesar, high purity	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways nylon holders	Viton (black)	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20180305_OT	Fine Metals; 99.998%	Fine Metals; 99.998%	Alfa Aesar, high purity	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways nylon holders	NA	0.5 mL	lead	3200 grit	triangle configuration	dishwasher: glassware chemical wash, plastic just water wash	NA	Oddy coupons crimped onto Shapeways nylon holders, placed in sealed pouch with kimax water vial and heat sealed into barrier foil package for testing. Coupons were placed vertically with Shapeways holder on floor of ~125mL 4-sided pyramidal pouch. Original, Cut-out was 8.5" x 8.5". Seals were approx 1/2" wide.
20171120_OT	Fine Metals; 99.998%	Fine Metals; 99.998%	Alfa Aesar, high purity	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways nylon holders	brown faux viton	0.5 mL	lead	3200 grit	triangle config.	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20171116_OT_b	Fine Metals; 99.998%	Fine Metals; 99.998%	Alfa Aesar, high purity	all coupons rinsed with HPLC acetone and HPLC isopropanol	ultimaker nylon holders (met printed)	black Viton (Global O-ring)	0.5 mL	lead	3200 grit	triangle config.	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20171116_OT	Fine Metals; 99.998%	Fine Metals; 99.998%	Alfa Aesar, high purity	all coupons rinsed with HPLC acetone and HPLC isopropanol	Shapeways nylon holders	black Viton (Global O-ring)	0.5 mL	lead	3200 grit	triangle config.	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20171030_OT	Fine Metals; 99.998%	Fine Metals; 99.998%	Alfa Aesar, high purity	all coupons rinsed with HPLC acetone and HPLC isopropanol	one stopper (McMaster-Carr, new), one Shapeways star (more solid) holder	black Viton (Global O-ring)	0.5 mL	lead	3200 grit	triangle config.	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20171024_OT		Fine Metals; 99.998%	Alfa Aesar, high purity	all coupons rinsed with HPLC acetone and HPLC isopropanol	one stopper (McMaster-Carr, new), one Shapeways star (more solid) holder	black Viton (Global O-ring)	0.5 mL	lead	3200 grit	triangle config.	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20171002_OT		Fine Metals; 99.998%	Alfa Aesar, high purity	all coupons rinsed with HPLC acetone and HPLC isopropanol	one stopper (McMaster-Carr, new), one Shapeways star (more solid) holder	black Viton (Global O-ring)	0.5 mL	lead	3200 grit	star formation in stopper	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20170922_OT	alfa aesar, high purity	fine metals; 99.998%	alfa aesar, high purity	coupons rinsed with acetone & isopropanol	A stopper – McMaster-Carr; B stopper - Sanitech	black Viton (global O-ring)	0.5 mL	lead	3200 grit	triangle config.	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20170918_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	low - 99.95%	coupons rinsed with acetone & isopropanol	new stoppers	black Viton (Global O-ring)	0.5 mL	lead	3200 grit	coupons touching sample, not in stopper	dishwasher: glassware chemical wash, plastic just water wash	4 Nm torque	
20170310_OT	High	Low	High	Cu and Pb cleaned with acetone	Ne	Silicone o-ring	0.5 mL	Lead	3200	Triangle config.	Not noted	4 Nm torque	
20170118_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity					lead	3200 grit		hand wash	4 Nm torque	
20170111_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	no rinsing	Sanitech stoppers (new)			lead	3200 grit	triangle config.	hand wash	4 Nm torque	
20161218_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	only lead rinsed	one new one used Sanitech	silicone o-ring	0.5 mL	lead	3200 grit	not noted	hand wash	4 Nm torque	
20161215_OT_b	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity		Sanitech stoppers (used)	silicone o-ring		lead	3200 grit	triangle & parallel config.	hand wash	4 Nm torque	
20161215_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	Cu and Ag not rinsed; lead rinsed	Sanitech stoppers (new)	silicone o-ring		lead	320 grit	triangle & parallel config.	hand wash	4 Nm torque	
20161208_OT_b	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	Cu and Ag not rinsed; lead rinsed	Sanitech stoppers; B new, A used;	silicone o-ring		lead	3200 grit	triangle & parallel config.	hand wash	4 Nm torque	
20161121_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	rinsed coupons with acetone	Sanitech stoppers; used/unused state unknown	silicone o-ring	0.5 mL	lead	3200 grit	triangle & parallel config.	hand wash	4 Nm torque	
20161121_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	all coupons rinsed with acetone	Sanitech stoppers, used/unused state unknown	silicone o-ring	0.5 mL	lead	3200 grit	triangle & parallel	hand wash	4 Nm	
20161110_OT_b	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	rinsed with acetone	stoppers (used); Sanitech	silicone o-ring	0.5 mL	lead	3200 grit	triangle & parallel config.	hand wash	4 Nm torque	
20161110_OT_b	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	coupons rinsed with acetone	1 triangle Sanitech (used), 1 parallel Sanitech (used)	silicone o-ring	0.5 mL	lead	3200 grit	triangle & parallel config.	hand wash	4 Nm torque	
20161110_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	all metals rinsed with acetone	stoppers (used); Sanitech and not Sanitech	silicone o-ring	0.5 mL	lead	3200 grit	hand wash	4 Nm torque	4 Nm torque	
20161014_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity		stoppers	silicone o-ring	0.5 mL	lead	3200 grit	triangle & parallel config.	hand wash	4 Nm torque	
20161007_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	Cu and Ag rinsed with acetone	stoppers	silicone o-ring	0.5 mL	lead	3200 grit	parallel	hand wash	4 Nm torque	
20161004b_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	Cu and Ag rinsed with acetone	stopper; phase where some stoppers were not officially platinum Cured	silicone o-ring	0.5 mL	silver	2400 grit	triangle & parallel config.	hand wash	4 Nm torque	
20161004_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	Cu and Ag rinsed with acetone	stopper; phase where some stoppers were not officially platinum Cured	silicone o-ring	0.5 mL	lead	3200 grit	coupons interleaved with fabric	hand wash	4 Nm torque	
20160926_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	Cu and Ag rinsed with acetone	stopper; phase where some stoppers were not officially platinum Cured	silicone o-ring	0.5 mL	lead	3200 grit	triangle & parallel config.	hand wash	4 Nm torque	
20160822_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	stopper; phase where some stoppers were not officially platinum Cured	stopper; phase where some stoppers were not officially platinum Cured	o-ring	0.5 mL	lead	3200 grit	triangle & parallel config.	hand wash	4 Nm torque	
20160722_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	stopper	stopper	silicone o-ring	0.5 mL	lead	2400 grit	parallel	hand wash	4 Nm torque	
20160705_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	stopper	stopper	None	0.5 mL	all, both sides	3200 grit	parallel	hand wash	hand tightened	
20160630_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	stopper	stopper	silicone o-ring	0.5 mL	all, both sides	3200 grit	parallel	hand wash	4 Nm torque	
20160629_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	stopper	stopper	silicone o-ring	0.5 mL	lead, one side	3200 grit	parallel	hand wash	hand tightened	
20160623_OT	Alfa Aesar, high purity	Alfa Aesar, high purity	Alfa Aesar, high purity	stopper	stopper	None	0.5 mL	lead	3200 grit	parallel	hand wash	hand tightened	
20160620_OT		low purity		stopper	stopper	None	0.5 mL	none	n/a	parallel	hand wash	hand tightened	