

Materials List for

Gold Nanoparticle Synthesis

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Materials

Name	Company	Catalog Number	Comments
50 mL Conical Centrifuge Tubes with Plastic Caps (Quantity: 12)	Ted Pella, Inc.	12942	used for cleaning/storing gold nanoparticle solution/precipitate (it's best to use 12 tubes, to allow the gold nanoparticles from the synthesis process to last up to one year (e.g., 1 tube per month))
Acetone	Sigma-Aldrich	270725-2L	solvent for cleaning glassware/tubes
Acid Wet Bench	N/A	N/A	for cleaning chemical reaction glassware/supplies with gold etchant solution (part of wet chemical lab facilities)
Aluminum Foil	Reynolds	B08K3S7NG1	for covering glassware after cleaning it to keep it clean
Burette Clamps	Fisher Scientific	05-769-20	for holding the condenser tube and reaction vessel during the synthesis process (located in the nitrogen glove box)
Centrifuge (with 50 mL Conical Centrifuge Tube Rotor/Adapter)	ELMI	CM-7S	for spinning the gold nanoparticles in solution and precipitating/collecting them at the bottom of the 50 mL conical centrifuge tubes
DI Water	Millipore	Milli-Q Direct	deionized water
Fume Hood	N/A	N/A	for cleaning laboratory glassware and supplies with solvents (part of wet chemical lab facilities)
Glass Beaker (600 mL)	Ted Pella, Inc.	17327	for holding reaction vessel, condenser tube, glass pipette, and magnetic stir bar during cleaning with gold etchant and then with water
Glass Beakers (400 mL) (Quantity: 2)	Ted Pella, Inc.	17309	for measuring toluene and gold etchant
Glass Graduated Cylinder (5 mL)	Fisher Scientific	08-550A	for measuring toluene and oleylamine for injection
Glass Graduated Pipette (10 mL)	Fisher Scientific	13-690-126	used with the rubber bulb with valves to inject the gold nanoparticle precursor solution into the reaction vessel

Gold Etchant TFA	Sigma-Aldrich	651818-500ML	(with potassium iodide) for cleaning reaction vessel, condenser tube, magnetic stir bar, glass pipette [alternatively, use Aqua Regia]
Isopropanol	Sigma-Aldrich	34863-2L	solvent for cleaning glassware/tubes
Liebig Condenser Tube (~500 mm) (24/40)	Fisher Scientific	07-721C	condenser tube, attaches to glass reaction vessel
Magnetic Stirring Bar	Fisher Scientific	14-513-51	for stirring reaction solution during the synthesis process
Methanol (≥99.9%)	Sigma-Aldrich	34860-2L-R	new, ≥99.9% purity (for washing gold nanoparticles after synthesis)
Microbalance (mg resolution)	Accuris Instruments	W3200-120	for weighing tetrachloroauric acid powder (located in the nitrogen glove box)
Micropipette (1000 µL)	Fisher Scientific	FBE01000	for measuring and dispensing liquid chemicals such as oleylamine and toluene (if using micropipette instead of graduated cylinder for measurement)
Micropipette Tips (1000 µL)	USA Scientific	1111-2831	for measuring and dispensing liquid chemicals such as oleylamine and toluene (if using micropipette instead of graduated cylinder for measurement)
Nitrile Gloves	Ted Pella, Inc.	81853	personal protective equipment (PPE), for protection, and for keeping nitrogen glove box gloves clean
Nitrogen Glove Box	M. Braun	LABstar pro	for performing gold nanoparticle synthesis in a dry and inert environment
Non-Aqueous 20 mL Glass Vials with PTFE-Lined Caps (Quantity: 2)	Fisher Scientific	03-375-25	for weighing tetrachloroauric acid powder and mixing with oleylamine and toluene to make injection solution
Oleylamine (Technical Grade, 70%)	Sigma-Aldrich	O7805-100G	technical grade, 70%, preferably new, stored in the nitrogen glove box
Parafilm M Sealing Film (2 in. x 250 ft)	Sigma-Aldrich	P7543	for sealing the gold nanoparticles in the 50 mL centrifuge tubes after the synthesis process is over
Round Bottom Flask (250 mL) (24/40)	Wilmad-LabGlass	LG-7291-234	glass reaction vessel, attaches to condenser tube
Rubber Bulb with Valves (Rubber Bulb-Type Safety Pipet Filler)	Fisher Scientific	13-681-50	used with the long graduated glass pipette to inject the gold nanoparticle precursor solution into the reaction vessel
Rubber Hoses (PVC Tubes) (Quantity: 2)	Fisher Scientific	14-169-7D	for connecting the condenser tube to water inlet/outlet ports
Stainless Steel Spatula	Ted Pella, Inc.	13590-1	for scooping tetrachloroauric acid powder from small container
Stand (Base with Rod)	Fisher Scientific	12-000-102	for holding the condenser tube and reaction vessel during the synthesis process (located in the nitrogen glove box)
Stirring Heating Mantle (250 mL)	Fisher Scientific	NC1089133	for holding and supporting reaction vessel sphere, while heating with magnetic stirrer rotating the magnetic stirrer bar
Tetrachloroauric(III) Acid (HAuCl ₄) (≥99.9%)	Sigma-Aldrich	520918-1G	preferably new or never opened, ≥99.9% purity, stored in fridge, then opened only in the nitrogen glove box, never exposed to air/water/humidity

Texwipes / Kimwipes / Cleanroom Wipes	Texwipe	TX8939	for miscellaneous cleaning and surface protection
Toluene (≥99.8%)	Sigma-Aldrich	244511-2L	new, anhydrous, ≥99.8% purity
Tweezers	Ted Pella, Inc.	5371-7TI	for poking small holes in aluminum foil, and for removing Parafilm
Vortexer	Cole-Parmer	EW-04750-51	for vortexing the gold nanoparticles in toluene in 50 mL conical centrifuge tubes to resuspend the gold nanoparticles into the toluene solution