

Materials List for:

Automated, High-resolution Mobile Collection System for the Nitrogen Isotopic Analysis of NO_x

Paul K. Wojtal^{1,2}, David J. Miller^{2,3}, Mary O'Connor¹, Sydney C. Clark^{2,3}, Meredith G. Hastings^{2,3}

¹Department of Chemistry, Brown University

²Institute at Brown for Environment and Society, Brown University

³Department of Earth, Environmental, and Planetary Sciences, Brown University

Correspondence to: Meredith G. Hastings at meredith_hastings@brown.edu

URL: <https://www.jove.com/video/54962>

DOI: [doi:10.3791/54962](https://doi.org/10.3791/54962)

Materials

Name	Company	Catalog Number	Comments
Gas Washing Bottle			Custom Design used, numerous companies sell other gas washing bottles. The bottle needs to have a frit inside it.
Syringe Pump	Kloehn	Kloehn Versa Pump 6, 55 Series	
PTFE Isolation Valves	Parker	002-00170-900	Both 2 three way and double two-way normally closed, electronically actuated valves
Gas Handling Teflon Tubing	McMaster Carr	5033K31	Quarter inch outer diameter, eighth inch inner diameter, PTFE tubing
Liquid Handling Tygon Tubing	McMaster Carr	5103K32	Quarter inch outer diameter, eighth inch inner diameter, PTFE tubing
Compression gas fittings and ball valves (assorted)	Swagelok	Assorted	Stainless Steel
Flow calibrator	MesaLabs	Defender 520	
Compression PFA fittings	Cole Parmer	Assorted	Gas and liquid handling
Data Acquisition Board	National Instruments	NI USB-6001	Used for valve switching
Solid State Relay	Crydom	DC60S5	Used for valve switching
Single Stage Filter Assembly	Savillex	401-21-25-50-21-2	Use 25 mm and 47 mm diameter holders
Nylon Membrane Filter	Pall Corporation	66509	1 µm filter, both 25 mm and 47 mm diameter filters
Hydrophobic Membrane Filter	Millipore	LCWP04700	10.0 µm, 25 mm and 47 mm diameter filters
Particle Membrane Filters	Millipore	FALP04700	1 µm filter, both 25 mm and 47 mm diameter filters
Mini Diaphragm Pump	KNF	UN 816.1.2 KTP	Used for stationary lab
Mini Diaphragm Pump	KNF	PJ 26078-811	Used for mobile lab
Aluminum	Onlinemetals.com	6061-T6	Cut to size to build system
Deep Cycle Power Battery	EverStart	24DC	
MilliQ Water	Millipore	ZMQSP0DE1	
Potassium Permanganate 1 N Solution	Fischer Scientific	SP282-1	
Sodium Hydroxide Pellets	Fischer Scientific	S318-1	
Ohaus Benchtop scale	Pioneer	EX224N	
4 ounce Amber Glass Bottles	Qorpak Bottles	GLC-01926	(60 ml and WM 125 ml bottles)

Amber HDPE Bottles	Fischerbrand	300751	Part number given for 125 ml narrow mouth bottles, Two varieties (125 wide mouth and narrow mouth of some volume)
Pre-cleaned EPA Amber Wide-mouth Bottle, 500 ml	Cole Parmer	EW-99540-55	
Hydrogen Peroxide 30%	Fischer Chemical	H325-500	Corrosive
Centrifuge 5810 R	Eppendorf	5821020010	
50 ml Polypropylene Conical Tube	Falcon	14-432-22	
12 N Hydrochloric acid	Fischer Scientific	A114SI212	Corrosive
Colorimetric Nutrient Analyzer	Westco Scientific Instruments	SmartChem 170	In purchasing the Colorimetric Nutrient Analyzer, this comes with buffers, cleaning solutions, rinse solutions, and solutions for running the instrument, including the solutions to be able to activate the cadmium column in the instrument for nitrate analysis.
Automatic Titrator	Hanna Instruments	HI 901	
20 ml Clr Headspace Vial	Microleter, a WHEATON Company	W225283	Information listed is for 20 ml vials. 50 ml vials can also be purchased from the vendor listed.
Septa, 20 mm Gray Butyl Stopper	Microleter, a WHEATON Company	20-0025	
Seal, 20 mm Standard Aluminium	Microleter, a WHEATON Company	20-0000AS	
25 G x 1 1/2 BD PrecisionGlide Needle	BD	305127	
26 G x 1/2 BD PrecisionGlide Needle	BD	305111	
Helium		05078-536	Can order from many different sources
Crimper/Uncrimper	WHEATON	61010-1	
Isopropanol	Fischer Chemical	A459-1	
Syringes of varying size for mass spec injection	BD	Varies based on size	
Antifoam B Emulsion	Sigma-Aldrich	A5757-500ML	
IRMS	ThermoFischer Scientific	IQLAAMGAATFADEMBHW	The actual isotope ratio mass spectrometer is listed here. Our set up also includes a gas bench and an autosampler.
Gass Bench II	ThermoFischer Scientific	IQLAAEGAATFAETMAGD	
TriPlus RSH™ Autosampler	ThermoFischer Scientific	1R77010-0200	Choose product for headspace injection
42i NOx Concentration Analyzer	ThermoFischer Scientific	101350-00	
NOx Box	Drummond Technologies	LMA-3D/LNC-3D	
CO ₂ analyzer	Licor 7000	7000	
GPS	Garmin	010-00321-31	
Model 146i Dynamic Gas Calibrator	ThermoFischer Scientific	102482-00	
Model 111 Zero Air Supply	ThermoFischer Scientific	7734	
50.2 ppm NO in N ₂ Gas standard	Praxis Air	Will vary with each tank of standard air purchased	