

Instructions for quantitative and isotopic ($\delta^{13}\text{C}$) analysis of dissolved inorganic carbon (DIC) and dissolved organic carbon (DOC) via TOC-IRMS.

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If DOC/DIC concentrations are unknown, collect three aliquots of 40mL each. The first sample will be used to **qualitatively** determine DIC/DOC concentrations. The second sample will be used to **quantitatively** determine the DIC concentration and analyze DIC for $\delta^{13}\text{C}$. The third sample will be used to **quantitatively** determine the DOC concentration and analyze DOC for $\delta^{13}\text{C}$. Sample vials should be filled completely with no headspace and sealed firmly to minimize CO_2 degassing and atmospheric contamination. It helps to wrap (and stretch) electrical tape around the cap/bottle connection to fully secure the caps during transport. Samples should be filtered through glass-fiber filters (pore size of $< 1\mu\text{m}$) to remove particulates prior to analysis. We recommend using pre-combusted 47-mm diameter Whatman GF/F filters (nominal pore size = $0.7\mu\text{m}$), B-D 60-ml syringes, and a Millipore 47-mm syringe filter assembly.

Vial 1) DOC/DIC concentrations: Filter sample into amber borosilicate vial with silicon/teflon lined septa. STORE ON ICE, or in the fridge.

Vial 2) Carbon isotopic composition of DOC: Filter sample into amber borosilicate vial with silicon/teflon lined septa. Acidify with $50\mu\text{l}$ of 85% H_3PO_4 . STORE ON ICE or in the fridge.

Vial 3) Carbon isotopic composition of DIC: Filter sample into amber borosilicate vial with black butyl rubber septa. STORE ON ICE or in the fridge.

Include, if known, alkalinity and pH for all samples.

You may wish to add a small volume (e.g., 8 drops or ca. $50\mu\text{l}$) of a saturated mercuric chloride solution to the vials to impede microbial activity during storage. For hazardous waste reasons, please be sure to tell us if you preserved your samples with HgCl_2 .

DO NOT FREEZE SAMPLES, OR SHIP ON DRY ICE. Keep the samples cool with ice packs, and use an overnight courier, if possible. If you want your cooler returned to you, please include a pre-paid FedEx or UPS return form.

Include an inventory list with your samples and a cover letter describing which analyses you want, as well as briefly outlining how you filtered and preserved your samples.

Recommended supplies

- Whatman GF/F filters, pack of 100, 47-mm dia.: VWR cat# 28497-958.
- B-D Plastipak 60-ml syringes, VWR cat# BD300866.
- Millipore Swinnex 47-mm filter holder, Millipore cat# SX0004700.
- Nalgene filter forceps, VWR cat# 28198-976.
- TraceClean vials: Precleaned, 40 mL, amber borosilicate, 0.125" Teflon resin/silicon septa liner, open-top cap, VWR cat# 15900-024
- Butyl rubber septa from McMaster-Carr (<http://www.mcmaster.com/>) Black Butyl Rubber: 8609K67 Air-Tight Butyl Rubber Plain Back, 1/8" Thick, 36" Width, 60A Durometer at \$17.00 per Ft.
- Septa Punch for TIC-TOC vials from McMaster-Carr (<http://www.mcmaster.com/>): 3427A22 Arch Punch 7/8" Hole Diameter, \$15.69 each