



The Model 405 nm NO₂/NO/NO_x Monitor™

Direct Measurement of NO₂ while Also Measuring NO & NO_x

Our [Model 405 nm NO₂/NO/NO_x Monitor](#) is a US EPA Federal Equivalent Method for compliance monitoring of NO₂. It's the only instrument on the market today that provides a direct measurement of NO₂ (via absorbance at 405 nanometers) while also providing NO and NO_x measurements. A rundown of its main features:

- Direct measurement of NO₂ by absorbance at 405 nm (FEM approved for 0-500 ppb NO₂, [EQNA-0217-243](#))
- Nitric oxide (NO) measured by selective conversion of NO with O₃
- Range of 0-10,000 ppb for NO₂; range of 0-2,000 ppb for NO_x and NO
- Interference-free; insensitive to other N-containing compounds
- Doesn't require a solid-phase NO₂-to-NO converter or photolytic converters which don't typically achieve 100% conversion
- Designed with a patent-pending folded tubular cell with a ~2-meter path length (described in [our paper in Atmospheric Measurement Techniques](#))
- Modes: NO₂ only; NO only; NO₂, NO, and NO_x
- New measurement produced every 5 seconds
- Relatively low power requirements (17 watt during operation, 35 watts during warmup) compared with other instruments on the market today
- [See a comparison](#) with other instruments



The Model 405 nm is a rack-mount sized instrument weighing less than 19 lbs. and requiring 17 watts during operation.

Request a quote today!

Mention this article to get a 10% discount on the Model 405 nm.

Offer ends 31 May 2019.

(Offer applies to U.S. and Canadian customers.)

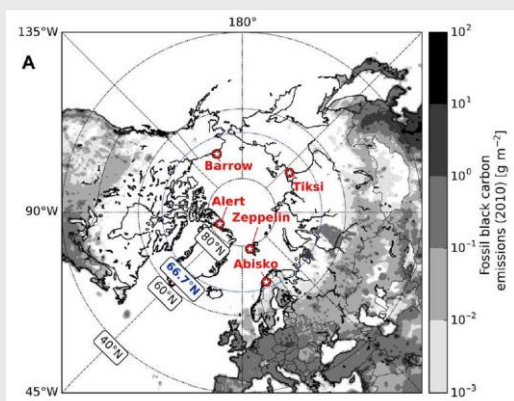
More Info About the Model
405nm NO₂/NO/NO_x
Monitor

Request a Quote

Air Pollution News

Burning Questions... and Some Answers about Sources of Black Carbon in the Arctic

Study Sheds Light on the Dark Horse in Arctic Climate Change



Black carbon measurements were made throughout the Arctic at stations in the U.S., Russia, Canada, Norway, and Sweden. Data were collected for 1 consecutive year or more at each site in overlapping periods from 2011-2015.

[Excerpt from Figure 1 of Winiger et al., 2019.]

Warming faster than the rest of the globe, the Arctic region may be the canary in the coal mine on the issue of climate change. One likely factor is the black carbon particles ("soot") arriving from fires and fossil fuel burning in adjacent northern regions. With a lifetime in the atmosphere of only a few days, black carbon deposits to the Arctic ice/snow surface. The "dirty snow" absorbs more sunlight and promotes faster melting.

A question for decision-makers has been: Which type of burning has the biggest impact on black carbon in the Arctic? A new study published in [Science Advances](#) has taken the most detailed look yet. Measurements over several years at five stations spread around the Arctic showed that burning fossil fuels leads to most of the soot (over 60% on average), but that biomass burning sources increase during the summer (e.g., wildfires, crop burning). The researchers collected samples on

filters for several days at intervals across the seasons from ~2011 to 2015, analyzing them for carbon-14 content (absent in fossil-fuel soot due to carbon-14's half life of ~6000 years) and carbon-13 content (which can distinguish between different fuel sources such as coal and natural gas).

The study combined the researchers' long-term observations with modeling to make a leap in understanding, overcoming previous limitations of studies based on uncertain emissions inventories and shorter-term observations. Says lead author Patrik Winiger (Vrije University in Amsterdam), "Some people think it's biofuels and wildfires, but our main takeaway is that fossil fuels are the main source of black carbon in the Arctic." The implication is that mitigation strategies aimed at fossil fuels (burned in sources such as factories, home heating/cooling, coal-fired power plants, and vehicles) would be most effective in slowing the black carbon component of Arctic climate change.

[Source apportionment of circum-Arctic atmospheric black carbon from isotopes and modeling](#), P. Winiger, T.E. Barrett, R.J. Sheesley, L. Huang, S. Sharma, L.A. Barrie, K.E. Yttri, N. Evangelizou, S. Eckhardt, A. Stohl, Z. Klimont, C. Heyes, I.P. Semiletov, O.V. Dudarev, A. Charkin, N. Shakhova, H. Holmstrand, A. Andersson and O. Gustafsson, *Science Advances* (2019) 5:eaau8052, 10 pp.

Case Studies

2B Tech Ozone Monitors Put to Work in Food Industry, Personal Exposure Studies

Getting Fruit from Farm to Table

The food industry often uses ozone treatment to ward off contamination or over-ripening as foods move from the fields to the grocery store. 2B Tech's ozone monitors were front and center in two recent studies of the effectiveness of gaseous ozone treatments.

- [Wang et al.](#) used the [Model 106-MH](#) to monitor treatments of grape tomatoes with 2-hour and 4-hour exposures to ozone concentrations ranging from ~2-7 mg/L. They found that *Salmonella* populations were reduced only at the higher ozone levels. However, the treatments did cause deterioration in quality measures of the tomatoes such as appearance, color, firmness and vitamin C content.
- [Piechowiak et al.](#) used the [Model 106-M](#) to investigate how periodic 30-min ozone doses at 8-10 ppm affected the shelf-life of raspberries, which are especially fragile after harvest. Twice-daily exposures for 3 days did reduce the growth of bacteria and fungi from 100% to 12%, showing that ozonation could be a viable alternative to synthetic pesticides and would offer the advantage of leaving no residue on the fruit.

Medical Studies of Ozone Exposure

- [Niu et al.](#) used 2B Tech's [Personal Ozone Monitor \(POM\)](#) to study how ambient ozone exposure in China affects human respiratory function. The researchers monitored ozone at the individual level for 43 subjects during 3 days of their normal activities. Ozone increases as low as 10 ppb were associated with a physiological response related to respiration. The POM was crucial to the ability to link such small changes in ozone exposure to biological mechanisms underlying respiratory inflammation, because ozone varies too much spatially and temporally to use fixed-site ozone monitors.



2B Tech's Personal Ozone Monitor (POM)

[Quality deterioration of grape tomato fruit during storage after treatments with gaseous ozone at conditions that significantly reduced populations of *Salmonella* on stem scar and smooth surface](#), L. Wang, X. Fan, K. Sokorai, and J. Sites, *Food Control* (2019), **103**, 9-20.

[Impact of ozonation process on the microbiological and antioxidant status of raspberries \(*Rubus idaeus* L.\) fruit during storage at room temperature](#), T. Piechowiak, P. Antos, P. Kosowski, K. Skrobacz, R. Jozefczyk, and M. Balawejder, *Agricultural and Food Science* (2019), **28**, 35-44.

[Personal ozone exposure and respiratory inflammatory response: The role of DNA methylation in the arginase-nitric oxide synthase pathway](#), Y. Niu, R. Chen, Y. Xia, J. Cai, Z. Lin, C. Liu, C. Chen, L. Peng, Z. Zhao, W. Zhou, J. Chen, and H. Kan, *Environmental Science and Technology* (2018), **52**, 8785-8791.

Personal Ozone Monitor (POM)

Model 106-Series Ozone Monitors

Meet Our Technical Sales Representative Hayden Aubermann

If you've inquired about one of 2B Tech's instruments or visited our booth at a trade show, there's a good chance you've crossed paths with our Technical Sales Representative, Hayden Aubermann.

Hayden's passion for science and the environment brought him to 2B Technologies in November 2015, shortly after he received his degree in Biochemistry (with a minor in Chemistry) from the University of Colorado, Boulder. Hayden is responsible for sales, marketing, promotions, and outreach at conferences and trade shows. His science foundation and his encyclopedic knowledge of 2B Tech's growing lineup of instrumentation are readily apparent when customers contact him for help or information.



In talking with potential customers before they purchase an instrument, Hayden often asks as many questions as he answers. It's an exercise in technical and scientific matchmaking -- he wants to be sure to suggest the instrument that will meet the customer's needs and specific application. After a sale, he'll go the extra mile to answer any questions and get the customer up and running with their new instrument as quickly as possible. He's even personally delivered instruments in the Denver area to give customers a hands-on introduction to the new instrument.

Outside of work, Hayden enjoys sports of all kinds and can be found on the golf course when weather permits. He closely follows the Denver teams but can cite chapter and verse about nearly any pro or college team and players. He's especially keen on watching the Colorado Avalanche hockey games, as he can draw upon his years playing inline hockey while growing up and in high school.

2B Tech's Portable Nitric Oxide Source Receives Patent



We were recently awarded a patent for our portable nitric oxide source ([US Patent 10207927 B2](#)). The source uses commercially available N₂O cartridges commonly used to make whipped cream. Either 8-gram or 16-gram cartridges are placed in a holder that punctures the cartridge when installed on a small regulator. Photolysis of the N₂O produces the NO. The portable NO source eliminates the need for a compressed-gas cylinder of NO, making the source especially useful in field applications.

The portable NO source is used in 2B Tech's [Model 211 Ozone Monitor](#), the [Model 714 NO₂/NO/O₃ Calibration Source](#), and the [Model 408 NO Calibration Source](#)

See us at these upcoming conferences in 2019!

Conference Name	Conference Dates	Location
<i>American Industrial Hygiene Conference and Expo 2019</i>	<i>May 20-22</i>	<i>Minneapolis, MN</i>
<i>California Air Resources Board (CARB) Training Module (tentative)</i>	<i>June 4-6</i>	<i>Sacramento, CA</i>
<i>American Water Works Association ACE 2019 *</i>	<i>June 9-12</i>	<i>Denver, CO</i>
<i>International Ozone Association 2019</i>	<i>August 26-29</i>	<i>Atlanta, GA</i>
<i>Gulf Coast Conference</i>	<i>October 15-16</i>	<i>Galveston, TX</i>

* attendee only; 2B Tech will not have a booth