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Brookhaven

DNDC
Differential Refractometer



The **BI-DNDC** is a deflection type refractometer that may be used in either static or dynamic mode. In static mode, the specific refractive index increment, dn/dc, is determined. This value is required as a parameter in molecular weight measurements using light scattering.

In dynamic mode dn/dc is already known, and the instrument is used as a concentration detector for HPLC and GPC applications.

Features

All major features are user programmable in order to achieve the maximum flexibility. The **BI-DNDC** can be set using the front panel controls and read using the LED readout or by an external computer. It includes a 16-bit microprocessor, which allows user-friendly handling of all functions of the instrument, as well as refractive index and temperature data transfer to a personal computer via standard serial interface. The instrument comes with

BI-DNDCW software for use with any external PC.

Most importantly, warm-up time for the **BI-DNDC** is only one hour, much less than other models on the market.

Determination of dn/dc

The dn/dc determination maybe performed in two different ways: static and dynamic. Both methods require calibration of the instrument with a solvent/solute combination with known dn/dc, typically KCl in H_20. The calculated constant is then not solvent dependent and may be used for all further measurements.

Included with the BI-DNDC instrument is a syringe kit with PEEK and Teflon tubing, fittings and syringes.

Static dn/dc Method

In static mode, it is convenient to use separate syringes (2 – 2.5 mL) for the reference solvent and each concentration of the polymer solution to be measured. Sample may be recovered and reconstituted, if required. Typically, five or more concentrations, ranging from 0.1 to 10 mg/mL, are recommended. New instrument readings can be performed in a matter of minutes since it only takes ~ 0.5 mL of liquid to flush out the previous sample.

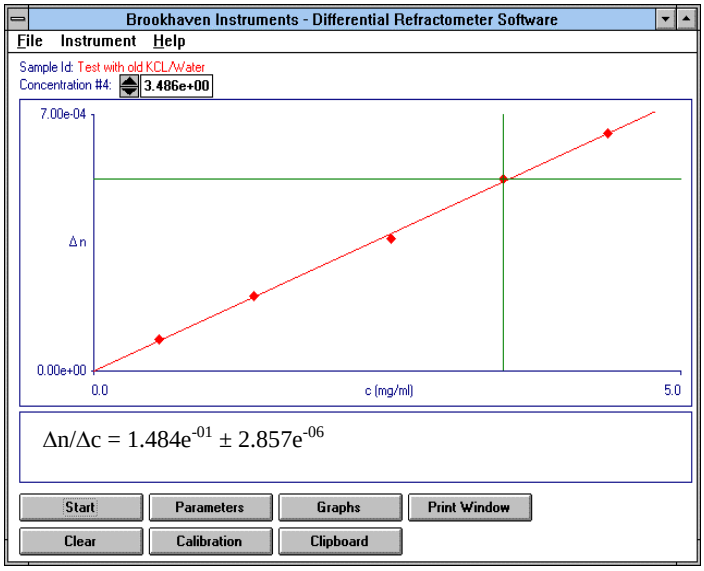
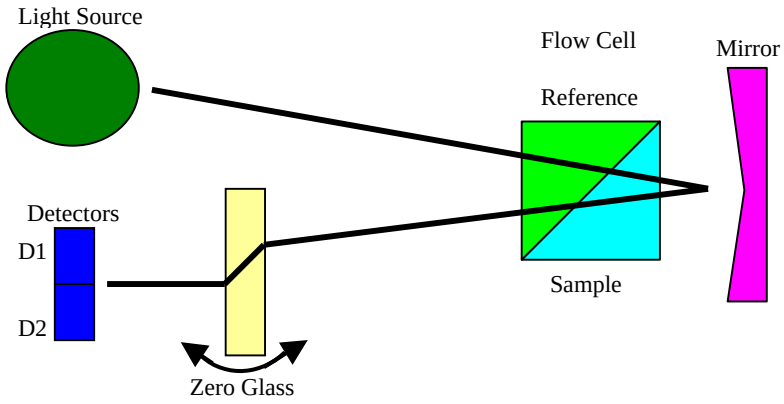


Figure 1, Optical Path



Dynamic dn/dc Method

This method applies for measurements performed with or without an HPLC/GPC separation column between injector and instrument. Working without a column has the advantage of faster measurements, since dead and separation volume from the column are not present and lower sample volumes are needed.

Features at a Glance

- Fast Instrument Warm-Up, ~ 1 hour
- Sensitivity, 2.5×10^{-9} ΔRIU
- Autozero
- Reference Cell Flush
- 9 Measurement Ranges
- DNDCW Windows Software
- Active Temperature Control to 80 °C

Specifications

Cell Angle:	45°
Cell Volume:	8 µL
Dead Volume (Inlet to Cell/Cell to Outlet):	25 µL/240 µL
Measurement Ranges (ΔRIU Full Scale):	6×10^{-4}, 3×10^{-4}, 1.5×10^{-4}, 7.5×10^{-5}, 3.75×10^{-5}, 1.87×10^{-5}, 9.3×10^{-6}, 4.6×10^{-6}, 2.3×10^{-6}
n_o range:	1.0 to 1.75 RIU
Sensitivity:	1.5 ng (Fructose in H_2O)
Noise Level	< 2.5×10^{-9} ΔRIU, 25 °C
Temperature Accuracy:	± 0.5 °C
Temperature Stability:	± 0.01 °C
Specify Wavelength:	620 nm, 535 nm or 470 nm
Tubing I.D.:	Sample Path 0.25 mm (10 mil) Ref. Path 0.75 mm (30 mil) Switchable for viscous solutions Outlet Path 1.0 mm (40 mil)
Flow Rate (typ/max):	1.0/3.0 mL/min (Analytical Mode) 5.0/12.0 mL/min (Prep. Mode)
Time Constant:	0.1 to 2 seconds
Analog Signal Output:	1 and 10 volt bipolar, full scale
Digital Signal Output:	RS-232/COM port
Software:	BI-DNDCW for static measurements
Data Transfer Rate (baud):	4800, 9600, 19200, 38400, 57600, 115200
Digital Inputs:	Flush, Zero, Sync, Error
Weight:	8 kg
Size:	160 x 175 x 340 mm

A policy of continual improvement may lead to specification changes

Brookhaven Instruments
750 Blue Point Road
Holtsville, NY 11742-1896 USA
Tel: +1(631)758-3200
shipping@BrookhavenInstruments.com
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