

UNIVERSITY OF LOUISIANA AT LAFAYETTE

STEP Committee

Technology Fee Application

Purchase of Melting Point Instruments for
Chemistry Laboratories

Title

August Gallo, Wu Xu & Steven
Krueger

Name of Submitter
(Faculty or Staff Only)

Chemistry-College of Sciences

Organization

Title: Purchase of Melting Point Instruments for Date: January 15,
Chemistry Laboratories 2024

Name (Contact Person): August Gallo

Address: Dept. of Chemistry- UL Lafayette

Phone Number: 482-6734 Email: gallo@louisiana.edu

Department/College/Org: Chemistry/College of Sciences

ABSTRACT (250 words or less):

Funding is requested to purchase 15 digital melting point instruments in the Department of Chemistry. The acquisition of these instruments will be used by students as they learn the theory and application of melting points in their teaching laboratories. These instruments have been designed with both safety and ease of use, making it an easy transition for both students and faculty in an academic setting. The requested instruments will add to and replace old melting point instruments that use thermometers and basically are outdated and quite costly to repair. Approximately, 440 students per year will use the melting point systems in undergraduate teaching labs and for undergraduate research. Funding of this proposal will benefit not only chemistry students, but also all students majoring in the sciences, engineering and pre professional health related fields.

Purpose of grant and impact to student body as a whole.

The motivation for this proposal is to acquire 15 melting point instruments to be used mainly for undergraduate teaching and secondly in undergrad research in organic, inorganic and macromolecular (polymer) chemistry. The melting range of a compound is one of the characteristic properties of a pure solid. Determination of physical constants in chemistry is a routine technique that is taught in freshmen chemistry and continues throughout the chemistry curriculum. The melting range is defined as the span of temperature from the point at which the crystals first begin to liquefy to the point at which the entire sample is liquid. Most pure organics melt over a narrow temperature range of 1-2 °C, if heated slowly enough. Impure samples will normally have melting ranges that are both larger (>1 °C) and begin at a lower temperature. Taking the melting range of a sample is useful for two reasons: It allows identification of an unknown sample (compare its observed melting range with that of known compounds). Also the assessment of sample purity for a known substance by comparing observed range for an actual sample to the known range for a pure sample, you can tell whether your actual sample is pure or contaminated (the range is depressed and broadened). Synthetic chemistry involves the preparation of known intermediates or new compounds and when they are solid, the melting point is one measure of their purity. The same situation takes place when synthesizing organic ligands with metals (inorganic) and monomers as starting compounds for polymers. The equipment used to measure melting point is digitally controlled, easy to use and does not require toxic mercury thermometers.

The chemistry department does have melting point instruments in its teaching labs, but they require thermometers. Since mercury is toxic and hazardous to work with, thermometers with mercury are no longer available. There are thermometers that have a nontoxic indicator, but they are not as accurate as mercury thermometers and have a limited range up to about 240° C. Since most modern instruments are now digital/computer controlled, chemistry should train its students with such instrumentation. In a typical teaching laboratory, there are 24 students and for many experiments in organic chemistry, each student requires a melting point apparatus for their lab report and analysis. Presently, chemistry has 9 working thermometer based melting point systems. Acquisition of 15 new digital instruments would allow each student to carry out their melting point and analysis.

The use of melting point instruments generally begins at the sophomore level when students enrolled in analytical, inorganic, and organic chemistry. Students in organic chemistry, inorganic chemistry and polymer /macromolecular chemistry will heavily use the requested instruments. Students in chemistry along with the disciplines of biology, engineering, environmental sciences will also be affected by this project. Students enrolled in Chemistry 233 (organic I lab) and Chemistry 234 (organic II lab) will be the major users of the melting point instruments each semester. Student enrollments just in these two labs amount to over 380 students per year. Students enrolled in Chemistry 252, 452 (inorganic chemistry), Chemistry 320 (macromolecular chemistry) and Chemistry 362, 462 (undergraduate research) account for another 60 students per year. Therefore, the number of students who will be impacted by the use of the requested software is appropriately 440 per year.

The project director, Dr. Gallo, has been teaching organic laboratories and techniques, including melting point for over 25 years. Students in organic, inorganic and polymer are presently using melting point instruments to help characterize small molecules and macromolecules.

3b. Projected lifetime of enhancement

The average life expectancy for a melting point instrument is about 7-10 years. Since there are no thermometers to replace, the electronics/thermocouple may decay over time.

3c. Person(s) responsible for:

i. Implementation

Dr. August Gallo will be responsible for ordering the instruments and receiving it.

ii. Installation

Dr. Xu and Mr. Krueger will install the digital melting point systems

iii. Maintenance

Typically, there is no maintenance. Dr. Xu will be responsible for any update installation of the electronics.

iv. Operation

Students and faculty members will use the melting point instruments.

v. Training

Dr. Gallo, Dr. Xu and Mr. Krueger will train the faculty and all undergraduates in the teaching labs. Dr. Gallo and Dr. Xu will train all new graduate students who will then train undergraduates in the teaching labs.

vi. STEP Plan Alignment

The use of digital and computer controlled equipment by undergraduate students is a required pathway for chemistry as outlined by the American Chemical Society. The training and use of the digital instruments will help to prepare our students for their future employment.

3d. Budget Justification

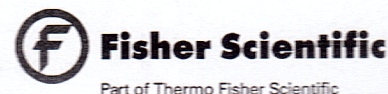
The total budget is \$18,750 for 15 Digital Melting Point apparatus systems. The cost of each instrument is \$1250. Thus the order of 15 of these instruments would amount to \$18,750. A recent price quote is attached to this STEP proposal.

Budget Proposal

- | | | |
|----|-------------|---|
| 1. | Equipment | \$18,750; 15 instruments at \$1250 each |
| 2. | Software | \$0 |
| 3. | Supplies | \$0 |
| 4. | Maintenance | \$0 |
| 5. | Personnel | \$0 |
| 6. | Other | \$0 |

TOTAL:	\$18,750
--------	----------

Sales Quotation



FISHER SCIENTIFIC COMPANY LLC
4500 TURNBERRY DRIVE
HANOVER PARK IL 60133-5491

Review and Place Order

[Click here or go through your purchasing system to fishersci.com quotes](#)

***Please reference this Quote Number on all correspondence.**

Don't have a profile? Register on fishersci.com

For complete Terms and Conditions, please [click here](#).

*Quote Nbr	Creation Date	Due Date	Page
3254-0249-32	09/11/2023		1 of 1
Payment Terms		Delivery Terms	
NET 30 DAYS		DESTINATION	
Valid To		Prepared By	
12/31/2023		KIRSCHBAUM, SHAUNA	
Customer Reference		Sales Representative	
MP APP DIGITAL QUOTE 091123		MASSI MALONE	
To place an order	Ph: 800-766-7000	Fx: 800-926-1166	
Submitted To:		Customer Account: 784669-022	
DENA BATTAGLIA MASSI.MALONE@THERMOFISHER.COM 337-482-5670		UL - CHEMISTRY (440000638 300 E ST MARY BLVD. MONTGOMERY HALL RM 120B LAFAYETTE LA 70503 ATTN: DENA BATTAGLIA	

Nbr	Qty	UN	Catalog Number	Description	Unit Price	Extended Price
1	1	EA	501531257	MELTING POINT APP DIGITAL 1EA	1,250.00	1,250.00



Melting Point Apparatus, Digital. This melting point apparatus has been designed with both safety & ease of operation in mind, making it ideal for use in education. The temperature is selected, measured and displayed digitally making it accurate and negating the need for a thermometer. The advanced CG-1839-A-10 has a 0.1 resolution and a variable ramp rate and hold key so that the exact melt temperature can be recorded. Two samples can be tested simultaneously. Adjustable back feet allow the unit to be operated at the optimum viewing angle. Full access to the block aids cleaning. To operate simply select a plateau temperature via the digital display & press "start". The unit quickly heats up and remains at the selected plateau temperature until the user is ready to start the test. Insert the sample tubes and press "start". The unit then heats at a fixed rate of 2C per minute. When the sample is seen to melt, note the temperature on the display. For use with 1.9mm OD tubes.
Vendor Catalog # CG-1839-A-10
This item is being sold as 1 per each

MERCHANDISE TOTAL

1,250.00

Shipping and handling fees are calculated at the time of shipment

NOTES:

We now offer highly competitive financing with low monthly payments. Please contact your local sales representative for more information.

Tell us about your recent customer service experience by completing a short survey. This should take no longer than three minutes. Enter the link into your browser and enter the passcode: USA-PGH-CS2

<http://survey.medallia.com/fishersci>