



Pondicherry University

Department of Physics

Tender Document

The Department of Physics, Pondicherry University invites sealed tenders under **two-bid system** for the supply of **Instruments** under **non-recurring grant** of project entitled **High Energy Density Lithium-Sulphur Rechargeable Batteries based on Garnet Structured Solid Electrolytes** sanctioned to Prof. Ramaswamy Murugan, Professor, Department of Physics by **Science and Engineering Research Board (SERB)**, New Delhi,. The technical specifications for the instruments are given below. All tenders should be sent to the address given below. The last date and time for the submission of tender is **26th November 2018, 03:00 PM**.

Name of the Instruments:

1. Vacuum Tubular Furnace
2. Planetary Mixer with degassing function
3. Compact Battery Electrode Coater
4. Hot Roll Press
5. Electronic Balance
6. Three Electrode Flat Cell

TECHNICAL SPECIFICATIONS

ITEM 1: Vacuum Tubular Furnace:

Type	Vacuum Tubular Furnace, Twin Model (two chamber), with one Quartz tube and the other with alumina tube with gas purging facility for both the tubes.	
Operating Method	Provision for using both or only one chamber at a time	
Technical Specifications:		
Inner Chamber	80% Alumina Tube of size 100 mm ID x 110 mm OD x 600 mm L, Work tube to be inserted in this Inner chamber	
Work tube	<u>1st Chamber</u> Quartz Tube of Size 85 mm ID x 90 mm OD x 750 mm L The Quartz tube should have opening at one end and provided with Quartz Plug with ground joint. The other end must be closed with outlet nozzle. End fittings must be provided for gas purging	<u>2nd chamber</u> High Purity Alumina tube of size 80 mm ID x 90mm OD x 750mm L. The Alumina tube will opened at both end and provided with SS end fittings for inert gas purging.
Hot Zone Length	250 mm L at the Centre of the Tube	
Max. Operating Temperature	1100 Deg.C.	
Heating Element	Kanthal A1 Coil	
Skin Temperature	Not to exceeds 50 °C	
Temperature Accuracy	+/- 1 to +/- 2 °C	
Temp. Sensor	Cr/Al thermocouple	
Power Rating	2000 watts	
Heating rate	2 °C/min for alumina tube, 5 °C/min for quartz tube	
Insulation	High quality Ceramic Fiber insulation round the sides of the inner chamber to have skin temperature not to exceed 50 deg. C at maximum operating temperature.	

Heating Element	High quality heating element wound in spiral form embedded in the Inner Chamber (Outer Alumina Tube of both chambers) and evenly distributed round tube.	
Temperature Control	Separate complete programmable temperature control for each tube	
Safety controller	In addition for over temperature protection a Safety controller must be incorporated in the unit	
Inert Gas Purging Arrangement	<u>1st Chamber</u> Must be provided with inlet and outlet nozzle for vacuum and gas purging in the Quartz tube	<u>2nd chamber</u> Must be provided with SS end fittings with Silicon 'O' ring for the Alumina tube. Water Cooling Jacket, Inlet and outlet nozzles for Gas Purging and Vacuum.

ITEM 2. Planetary Mixer with degassing function:

1. Capacity: Cup Size: 300 ml x 1 cup
2. Other Container for usage: **50 ml** x 1 cup, adapter and tubes with **1 to 9 gram** capacity to be provided along with a **Vortex Mixer for fine mixing of < 5 ml capacities.**
3. Number of Revolution
 - (i) Mixing Mode: 200-2000 rpm
 - (ii) Degassing Mode: 400-2200 rpm
 - (iii) Medium mode: 200-2000 rpm
4. Mixing heat to be sustained at the lower ratio of rotation speed, hence heat sensitive materials can be used.
5. Wave mode rotation should be possible
6. The speeds of revolution and rotation makes up and down (fast and slow) like wave motion, and then enhanced more efficient mixing and dispersing.
7. Mixing Mode: It should follow 40% against revolutions
8. Degassing Mode: It should follow 3% against revolutions
9. Setup Mode: 9 Step, 10 different kinds of motion pattern It can do continuous operation (on condition setup)
10. Setup time: Maximum 30 minutes (9 steps total)
11. Memory (Condition memory function)
12. User Setup Channel: 7 CH
13. Fixed Data Channel: 3 CH
14. Power supply: Single phase 220 V AC $\pm 10\%$, 50 Hz
15. Power consumption: 1.38 kW

ITEM3. Compact Battery Electrode Coater:

Stroke Length	10 - 220 mm adjustable by using Adjustable Position Switch		
Platform	Aluminum alloy flat vacuum chuck Vacuum Chuck Dimensions: 365 mm (L) x 200 mm (W)		
Film Applicator	150 mm width micrometer film applicator to be included, with adjustable thickness from 0.01 mm - 2 mm Traverse Pusher should be included for pushing the doctor blade to ensure constant speed coating Note: Thinnest film can be achieved should be at least 10 micron		
Voltage	220 V AC		
Traverse Speed	0 - 100 mm/sec variable Accuracy: 10mm/sec		
Vacuum Pump	Vacuum pump to be connected externally not integrated with instrument		
Heating Cover	Should be pre-installed on the top cover Built in digital temperature controller with accuracy of +/-1°C Suspension support to open cover easily and safely Max. Heating Temp.: 200°C		
Compliance	CE Certificate		
Accessories	High purity Battery Grade Foils		
	Type	Thickness (µm)	Quantity
	Aluminum Foil	20	1 Roll
	Copper Foil	20	1 Roll
	Polypropylene Separator (Celgard 2400)	16	1 Roll

ITEM 4. Hot Roll Press:

Roller Dimensions	100 mm(Dia.) x 200 mm(W)
Working Voltage	220V AC, 50 Hz,
Structure	Heavy duty steel frame, gears, and handle Dual micrometer for accurate thickness adjustment in the range 0 - 8 mm Maximum
Roller	1. Roller diameter tolerance: 0.004 mm 2. Material: Made from hardened tool steel (RC > 62) with Cr electroplated coating 3. Rolling Speed: 0-120 mm/s adjustable
Roller Surface Hardness	62 HRC
Compliance	CE Certificate
Accessories	<u>Punching tool for 2032 coin cell preparation</u> (high quality die block steel) <u>Technical parameter</u> A) 8 mm DIE B) 12 mm DIE C) 16 mm DIE D) 20 mm DIE

ITEM 5. Electronic Balance:

High Precision Electronic Balance up to four decimals

1. **Maximum Capacity:** 220 g
2. **Readout accuracy :** 0.1 mg (0.0001 g)
3. **Repeatability (Test Weight):** 0.1 mg (100 g)
4. **Weighing Pan Diameter:** 90 mm
5. **Adjustment:** Internal / FACT
6. **Resolution:** 0.1 mg
7. **Dimensions (L x H x W):** 290 mm x 331 mm x 193 mm

ITEM 6. Three Electrode Flat Cell for in situ Measurements:

1. A specially designed Test cell to evaluate the in situ characteristics of cells using solid electrolyte.
2. Flat cell must have a provision of using two electrodes also.
3. Flat cell must have a quartz window for carrying in situ XRD and IR-Raman measurements

Structure	Full stainless
Features	<ol style="list-style-type: none">1. 24 mm O.D. insert, which can accept 15 mm diameter electrodes.2. Sealed by electrolyte corrosive-proof PTFE O-rings.3. Electrolyte corrosive-proof PTFE Guide Sleeve capable of withstanding up to 250 °C.4. Adjustable spring tension on top to accept various electrode thicknesses.5. Easy to separate after testing.6. Small enough to be put into and taken out from a glove box.

TERMS AND CONDITIONS

I. General Information:

- a) Last date and time of receipt of the Quotations: **26 November 2018 at 3 PM**
- b) Date and Time of Opening of the Quotations: **26 November 2018 at 3.30 PM**
- c) Quotation / Tender Document fee Rs. 500/-
- d) EMD rates: 2.5% of the quoted price.
- e) **Two bid systems have to be strictly followed.** (one for Technical bid and another for commercial bid and each bid should be submitted in separate sealed covers with the description of Items/Item Name)
- f) Quoting merely the lowest price does not confer any right to any bidder for award of supply order. The University's Purchase Committee, reserves the right to select the any bid under the grounds of specification compliance, technologically advanced quality, proven performance track record, brand reputation, compatibility with the existing System, etc.
- g) **The quotation must be submitted along with the stipulated quotation document fee and EMD in the sealed cover, super-scribing "Quotation for ITEM 1. Vacuum Tubular Furnace, ITEM 2. Planetary Mixer with degassing function, ITEM 3. Compact Battery Electrode Coater, ITEM 4. Hot Roll Press, ITEM 5. Electronic Balance, ITEM 6. Three Electrode Flat Cell". The name and address of the bidder should also be mentioned at the "From address" space.**
- h) The quotations should be addressed and posted to the following address by speed/Registered post or by courier. ***Prof. Ramaswamy Murugan, Principal Investigator (SERB Project), Department of Physics, Pondicherry University, Puducherry – 605 014.***
- i) **Quotations will not be accepted through fax / e-mail.**

II. Common Conditions (Import or Indigenous)

1. Purchase of Quotation Document:

The Quotation / Tender document can be downloaded from the University website **www.pondiuni.edu.in** or procured from the Pondicherry University on payment of fee as specified above, by means of a D.D, drawn in favor of **the Finance Officer, Pondicherry University, payable at Puducherry**. The downloaded application should be accompanied with the quotation document fee, in the form of a Demand Draft.

2. Price Schedule

The rates should be quoted for a single unit and also for the total quantity required by the University. The price should include the delivery, installation, training charges, etc. at the Department of Physics, Pondicherry University. The prices quoted shall remain firm until the items are supplied to the Department of Physics, Pondicherry University.

3. Quoting the Core price & Tax, Duties, Discount etc.

The taxes/ duties/ discounts, if applicable, are to be explicitly and separately shown in the bid.

4. Eligibility:

The firm must have the requisite domain expertise with regard to supply, installation and post-sale service of the items they are quoting. The firm should have been in existence for at least six years as on the date of this quotation and must have executed at least three orders for this kind of equipment during the last three years.

5. Installation:

The engineer should install the equipment free of cost at the site. However, utilities like power, water, air etc. will be provided.

6. Delivery:

Within 4 weeks or earlier from the date of receipt of purchase order.

7. Duty Exemption:

The University has been granted the benefit of exemption from the payment of the Central Excise Duty and Customs Duty by the Department of Scientific and Industrial Research (DSIR), India, vide their Notification No.10/97 dt. 01-03-1997 and 51/96 dated 23.07.96 respectively, in respect of

- a) Scientific and technical instruments, apparatus, equipment, Software including computers.
- b) Accessories and spare parts of goods specified in (a) above and consumables.
- c) Computer software, compact disks, CD ROM, Recording magnetic tapes, microfilms, microchips etc.
- d) Prototypes.

Customs duties at Indian port, if any, will be to the account of the University.

8. Warranty:

i. The instrument covered under the purchase order, when installed, **shall be warranted** for the quality, workmanship, trouble free operation and performance **for a period of at least 36 months (preferably 5 years)** from the date of putting the system into operation at the Department of Physics, Pondicherry University, or at least 42 months from the date of receipt of the last lot of the consignment in India.

ii. If any item covered under warranty fails, the same shall be replaced free of cost including all the applicable charges including shipping cost both ways.

iii. Complete technical specifications of the equipment including the Operating system to be included in Technical bid.

iv. The necessary service support should be provided by Bidder during the agreement period.

v. The training should be provided by the supplying companies for a minimum period of four days from the date of installation with an expert team. Alternate years training should be provided during the license period.

vi. Technical post sale support by email and telephone will be provided during the period.

vii. Operating Manual should be provided in English.

viii. A clear statement regarding availability of after-sales service and availability of spare-parts for the next 3 to 6 years should be included.

- ix. A recent customer list (within last five years) with the contact details including the email address is to be submitted with the technical bids / bids as the case may be.
- x. If the equipment is proprietary a product, a proprietary product certificate should be enclosed.
- xi. The information pertaining to infrastructural, power and any other requirement for satisfactory installation and commissioning of the whole system must be provided by the bidder, at least 120 days in advance of the installation to be commenced if purchase order is issued.
- xii. The equipment must operate at 220V/ 50 Hz single phase and / or equivalent three phase electrical power.
- xiii. If the bidder is an authorized representative in India, they are requested to inform their technical ability to take care of the problems in the system, if developed later within the warranty and outside the warranty period. The responsibility of the Indian agent must be clearly specified.
- xiv. The bidder from abroad shall obtain, if required, export permission from the appropriate authorities in his country or the country of origin for items to be shipped to India in case of items to be imported. The University shall provide necessary information if required for this purpose.
- xv. The validity of the each quotation should be at least THREE MONTHS from the closing date.**
- xvi. The offers will not be considered if received after the **bid closing date and time**.
- xvii. The offers received through telex/ telefax/ e-mail will not be accepted by the University under any circumstances.
- xviii. The University shall not be responsible for any delay/ loss or non-receipt of quotations by post / courier service.
- xix. No unsolicited correspondence shall be entertained after submission of the offer.
- xx. If an order is placed with the firm, the purchase shall be governed by an agreement as per the University rules in force at the time.
- xxi. Additional terms and conditions will be incorporated in the purchase order, if needed, to safeguard the interests of the University.
- xxii. Quotation is not transferable.
- xxiii. In case of any dispute in respect of the quotation, all legal matters shall be instituted within the jurisdiction of the place where the purchaser ordinarily resides.

9. Power to reject the offer:

- i. Pondicherry University reserves the right to accept / reject any offer in full or in part or accept any offer other than the lowest offer without assigning any reason thereof. Any offer containing incorrect and incomplete information shall be liable for rejection.
- ii. No agency commission will be paid to any authorized agent in India.

iii. Liquidated damages: Timely supply of the ordered items, installation, commissioning (wherever is applicable) and training etc. is the essence of the contract. In case of failure to supply within the time specified in the Purchase order, a penalty / LD of 0.5% of the total value per week or a part thereof shall be levied subject to a maximum of 7.5 % in respect of items which are not supplied. The decision of Pondicherry University shall be final in this regard.

iv. Bidder(s) must be authorized business partners of Global / National service providers of the respective equipment.

v. The bidders must enclose authorization letter from the respective global / national service providers of the above said equipment's particularly mentioning an undertaking that in case of default by the bidder, they (Global Service Provider) shall take over all the responsibilities of the bidder.

vi. The bidder should not be involved in any bankruptcy filing for protection from it.

III. Specific Conditions for Imported Equipment's

1. Payment of EMD:

The quotation be accompanied by EMD as stated above, by means of Demand Draft , drawn in favor of The Finance Officer, Pondicherry University, payable at Puducherry. The Small scale units are exempted from the payment of EMD provided they enclose the proof of their exemption certificate issued by the competent authority.

2. Payment terms:

i) Normally a payment 90% will be released after the installation and training. However, 100 % payment will be released if the supplier provides Bank Guarantee towards performance security for the 10% of the total cost of the equipment to cover the warranty period.

ii) Bank charges in India shall be borne by the purchaser and outside India shall be borne by the contractor / supplier.

iii) The offer must be in English. The rates should be indicated both in figures and words against item specified in the given table. It is preferable that the price be quoted in US dollars or in major foreign currencies.

For any clarification with respect to technical specifications, please contact the respective Department PI as per the details given below: -

S. No	Name of the PI/Department	Contact Details
1	Prof. Ramswamy Murugan / Department of Physics	moranamurugan.phy@pondiuni.edu.in +91 9486521397

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