


<b>Name of Machine</b>	<b>Isotope ratio mass spectrometer (IRMS) with peripheral</b>	
<b>Make</b> Thermo Finnegan, Germany	<b>Model</b> a. Isotope Ratio Mass Spectrometer (IRMS): MAT 253 b. <b>Peripheral parts:</b> Elemental analyzer- Flash 2000HT; Gas Bench II.	
		
<b>Specification</b>		
<p>EI source, mass range <math>m/z</math> 1-150, Mass resolution 200 (C, N, O, S), Estimation of C, O, H, N and S isotopes and percentage.</p>		
<b>Working principle:</b>		
<p>A mass spectrometer generates multiples ions from the samples and then separates them according to their specific mass-to-charge ratio (<math>m/z</math>) and records the relative abundance of each ion type. Stable isotope facility at BSIP provides stable C, O, N, H and S isotopic ratio measurement of various natural and artificial substance using elemental analyser and gas bench interfaced to a continuous flow IRMS.</p>		
<b>Application</b>		
<p>In the field of oceanography, atmospheric sciences, biology, paleoclimatology, geology, environmental sciences, food and drug authentication, and forensic.</p>		
<b>User Instruction</b>		
<ul style="list-style-type: none"> <li>○ Send samples using courier or registered post. Trackable courier dispatch or registered post is recommended.</li> <li>○ All samples must be accompanied with a copy of the Submission Form you have filled in and emailed to the lab (available for download above) to identify each individual sample, identify the material and also give the full name and contact address of the submitter, with telephone and fax numbers and email address.</li> <li>○ Provide details of any prior treatment of the sample, such as cleaning, drying, and treatment with solvents or preservatives.</li> <li>○ Contact the concerned authorities at the institute to enquire about the</li> </ul>		

minimum sample size requirements for each isotope.

- Please contact us to ensure your samples are in a suitable format for processing.
- Send samples in small, labeled vials. Unused portions of samples after analyses shall be returned at your cost provided informed well in advance.
- Indicate if any samples are likely to be toxic or corrosive.
- Reporting time may be longer if large batches of samples are submitted or if the nature of the material is such that special processing methods are required.

We may be able to process urgent samples within several days at a priority rate, subject to current laboratory workloads.

### Contact Person

<b>In-Charge</b>	Dr. Anupam Sharma (0522-2742974); <i>Email <a href="mailto:anupam110367@gmail.com">anupam110367@gmail.com</a>; <a href="mailto:anupam.sharma@bsip.res.in">anupam.sharma@bsip.res.in</a></i>
<b>Staff:</b>	Dr. Shailesh Agrawal ( <u>0522-2742969</u> );
	Mr. Sandeep Kohri ( <u>0522-2742969</u> )

### charges

Instrument/Analysis	Students	Govt. Organization (University/Research Institutes)	Private sector/ Industry	Remarks (if any (Rates quoted Rs. )
<b>IRMS Lab</b>				Prepared sample will only entertained
<b>a. Gas Bench</b> (for $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ in carbonate)	600.00	800.00	1800.00	
<b>b. Elemental Analyzer</b> $\delta^{13}\text{C}$ (organic) $\delta^{15}\text{N}$	750.00 750.00	1000.00 1000.00	2000.00 2000.00	

### Guideline

Payment is to be made in advance through bank draft in favour of "Director, Birbal Sahni Institute of Palaeosciences". Please visit our web-site for updated Rate-List.

#### **Notes:**

1. Send samples using courier or registered post. Trackable courier despatch or registered post is recommended.
2. All samples must be accompanied with a copy of the Submission Form you have filled in and emailed to the lab (available for download above) to identify each individual sample, identify the material and also give the full name and contact address of the submitter, with telephone and fax numbers and email address.
3. Provide details of any prior treatment of the sample, such as cleaning, drying, and treatment with solvents or preservatives.

4. Contact the concerned authorities at the institute to enquire about the minimum sample size requirements for each isotope.
5. Please contact us to ensure your samples are in a suitable format for processing.
6. Send samples in small, labelled vials. Unused portions of samples after analyses shall be returned at your cost provided informed well in advance.
7. Indicate if any samples are likely to be toxic or corrosive
8. Reporting time may be longer if large batches of samples are submitted or if the nature of the material is such that special processing methods are required. We may be able to process urgent samples within several days at a priority rate, subject to current laboratory workloads.

### **Guidelines for Sample preparation**

Solid sample preparation is an essential step in determining the isotopic and elemental composition for both carbon and nitrogen analysis. This process involves three major steps: drying, grinding, and weighing. Each step must be performed with caution to ensure that the samples are not contaminated. BSIP analyses only natural abundance. Below are some suggestions for sample preparation procedures and a listing of our specific equipment for preparatory needs. If you have any questions please contact the facility personnel.

- I. **Acceptable Homogeneity-** Homogeneity is defined as a substance of uniform structure or composition throughout the entire sample matrix. Three things to consider when processing samples for uniform composition are sample particle size, texture and purity. There are many effective ways to grind samples including the use of a Wiley mill, freezer mill, roller grinder, and the standard mortar and pestle.
- II. **Weight-** Sample weight is relative to the type of sample that is being analyzed. Some typical weights are 3 mg for plant leaf samples, 1 mg for animal samples, 10 mg for root samples, and anywhere from 10-70 mg for soil and sediment samples. Soil and sediment sample weights are depend upon whether the sample is more organic or mineral based. A microbalance is available for weighing natural abundance samples. At BSIP we weigh all samples using tin capsules. The tin is essential for proper combustion in the elemental analyzer. Please contact the facility personnel for more information.
- III. **Shape-** The sample carousels can only hold samples of a certain size; therefore it is necessary that each and every sample is carefully prepared, rolled and shaped into a ball that will not get caught as the sample is being injected into the combustion column on the elemental analyzer. Flat or misshaped samples can get caught in the auto sampler!!! Also note that samples weighing more than 70 mg generally have combustion problems due to their large size.
- IV. **Sample Storage-** Liquid samples must be carefully sealed prior to shipment. It is necessary to fill vials completely to avoid possible isotopic fractionation due to evaporation processes in excess headspace within the individual vial. Please be sure to take extra precautions in shipping liquid samples. Be sure to package fragile glass vials tightly and safely. Water samples with a low pH (acidic) can cause damage to the ion source within the mass spectrometer. Be sure to discuss the possibility of very acidic or basic samples with BSIP personnel prior to sending samples. Once the samples reach the facility, they are stored in a refrigerator until analysis.

## Sample information form for Isotope Ratio Mass Spectrometer (IRMS)

**Organization Name:**

**User Name:**

**User Email:**

**User Mobile No:**

**Guide Name:**

**Guide Email:**

Sample Description along with sample code	1)	5)
	2)	6)
	3)	7)
	4)	8)
No. of Samples		
Sample is	Magnetic <input type="checkbox"/>	Nonmagnetic <input type="checkbox"/> Biological <input type="checkbox"/>
	Soil/Sediments <input type="checkbox"/>	Liquid <input type="checkbox"/>
Sample is	Hazardous <input type="checkbox"/>	Non-Hazardous <input type="checkbox"/>
Sample is	Toxic <input type="checkbox"/>	Non-Toxic <input type="checkbox"/>
Nature of Sample	Powder <input type="checkbox"/>	Film <input type="checkbox"/> Disc <input type="checkbox"/>
List of isotope/s to be analyzed:		

To be filled in by the user while submitting the form

Job No as in IRMS CF

Date of submission:

REQUISITION FORM

**BIRBAL SAHNI INSTITUTE OF PALAEOSCIENCES, LUCKNOW**

53, University Road, Lucknow, Ph. 0522-2740008, 2740399

(IRMS Central Facility)

Geochemistry Lab

**(Information to be filled in by the user)**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Email and Mobile No.: \_\_\_\_\_

Category (In-house/Students/Govt. organization/private): \_\_\_\_\_

Number of samples: \_\_\_\_\_

Nature of samples (with details): \_\_\_\_\_

Scientific Objective of this study: \_\_\_\_\_

Additional information, if any: \_\_\_\_\_

Location (Lat & Long; Altitude): \_\_\_\_\_

Exposed Section/Trench/Core/Others: \_\_\_\_\_

List of isotope/s to be analyzed: \_\_\_\_\_

Expected enrichment/depletion range and age of samples: \_\_\_\_\_

**(For office use only)**

Lab Reference No.:

R.P.C.C./ Registrar : Kindly raise the bill for the above

Total Charges:

Taxes:

Grand Total: