TECHNICAL SPECIFICATIONS OF Triple Quadrupole ICP MS System

Enquiry No:- ES/PROJECT/IS/2017-18/01 **DATE:- 12/01/2018**
BID CLOSING DATE:- 5TH FEB 2018

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Description	
1. Application Requirements	a. Fully automated computer controlled Triple Quadrupole ICP-MS capable to analyze all possible elements of periodic table simultaneously in the mass range 2 to 260 AMU or more in geological samples for dating applications. b. The instrument should be able remove direct isobaric overlaps using reaction chemistry (e.g. ^{204}Hg on ^{204}Pb; ^{87}Sr on ^{87}Rb; ^{176}Yb on ^{176}Hf) [Application notes/research articles must be provided] c. The instrument should be able to quantify concentrations of Os, Rb, Sr, Sm, Nd and platinum group elements in ppt levels. [Application notes/research articles must be provided] d. The Instrument should also be capable of isotopic ratio analysis/ dilution analysis of different isotopes of S and P. There should be no inter-isotopic product ion overlap. [Application notes/research

	articles must be provided]
2. ICP-MS/MS Sample introduction system	a. The sample introduction system should have very low dead volume with low uptake rate (0.25ml/min or better) to reduce the waste generation. b. The sample introduction system, torch & lens/ cones should be easily accessible for maintenance and must meet aqueous based applications, which includes suitable tubing. c. Quartz torch with glass or ceramic injector d. System should be provided with peltier cooled spray chamber, which can operate from -5 Deg C to + 20 Deg C or better . e. System should have built-in hardware for sample containing high TDS (20 % or more) with aerosol dilution & should be automated through software only. System should have min four s/w controlled MFC for Plasma, Auxiliary, Nebulizer and Make Up/Dilution Gas for high matrix sample introduction. Future upgradation capacity should be there for additional MFC for Oxygen gas for purging into system for organic samples.
3. Ion Source and RF Plasma	• The ICPMS must have computer controlled RF generator operating between 27 MHz operating from 0.6 to 1.6 KW for automatic control of torch ignition, shutdown and system warm up. The RF Generator & Coil must be air or water cooled.
4. Ion extraction interface	a. Suitable water-cooled interface under vacuum and with standard high performance Ni sampling and skimming cones to suit all applications. b. The cones/interface should be easily demountable with all torch movement, easily cleaned and replaced c. Lens /cons system should be outside the vacuum system to reduced down time
5. Ion focusing system	a. Ion focusing system capable of removing all neutrals & photons from the ion path without causing any wear and tear to any part of the optics.
6. Quadrupole system	a. System should include in tandem quadrupole system, one quadrupole before collision/reaction cell and the other after the cell b. First and Third Quadrupole should have unit mass filtering capability. c. First Quadrupole should not act as ION deflector.
7. Detector	EMT detector with both analogue and digital mode with min 10 orders of magnitude
8. Cell Technology	a. System should be provided with a collision and reaction cell to remove polyatomic & isobaric interferences. b. Collision and reaction cell should have separate gas lines with Four MFC for He, H_2, NH_3, O_2. System should be capable of using other gases like CH4, C2H2, C2H6, C3H4, C3H8, and CH3F.
9. Quadrupole analyzer	a. The mass range should be from 2 to 260 amu or more in both quadrupole. b. The dwell time should be as short as 0.1 ms for fastest settling

	c. Scan speed should be >3000 amu/s d. The mass filter should be stable and provide resolution of 0.1 amu or better. e. The analyzer must have the ability to discretely control the resolution of selected mass regions dynamically without affecting the overall nominal resolution of the system.
10. Ion detector	a. The ion detector must be discrete dynode electron multiplier with analogue and digital mode of operation. It should be capable of having 10 orders or more of linear dynamic range.
11. Vacuum system	a. System should have adequate and efficient vacuum system with a series of rotary and turbo pump. The high vacuum capability should be 10-5 or better.
12. Performance	a) Sensitivity (Mcps/ppm) • Be/Li > 50 • Y/In > 300 • Tl/U > 250 b) Detection Limit (ppt) • Be/Li: 0.5 ppt • Y/In: 0.1 ppt • Tl/Bi/U: 0.1 ppt c) Oxide ratio CeO/Ce:< 2% d) Background :<1 cps @ mass 9 and 238 amu e) Abundance sensitivity (Cs^{133}): $1x10^{-10}$ (Low , High) or better in MS/MS mode to measure Mn in high Fe matrix, 237Np in presence of U etc.
13. System controller and operating system& printer	a. The ICPMS and other attached supporting system shall be driven from a dedicated workstation having the latest hardware and operating system. The software shall provide fully integrated operation of the machine and sample inlet system. b. The software shall be capable of safe machine operation, be able to read output values and all important parameters involved in the machine operation.
14. Necessary Supplies	a. ICPMS tuning solutions b. Spares kit containing drain, sample Peristaltic pump tubing-sample intake peristaltic pump tubing-Drain Peristaltic pump tubing-internal standard Gasket for cones, Rough pump oil Micro mist nebulizer , Plasma Torch -min 2.5mm ID, Ni Sampling Cone , Ni Skimmer Cone , c. PFA inert kit containing Sapphire torch, sapphire injector, spray chamber, concentric nebulizer, d. Pt Cones for sample and skimmer. e. Additional quartz torch. f. Multielement standard with at least 20 elements (NIST certified). g. Humidifier h. Auto-sampler with Min 200 vial capacity.
15. Local accessories required for installation	a. Required exhaust system for the ICPMS. b. Gas Cylinders and SS Regulators for Ar (4 qty.), He (2 qty.), H2 (1 qty.), O2 (2 qty.) and NH3 (3 qty.) with desired purity. Ar gas

	cylinders should be supplied with automatic switching valve. c. Gas purification panel and necessary fittings. d. 20KVA online UPS with min 30 minutes backup.
16. Warranty	Comprehensive warranty for 1 yr. Additional 2 years warranty should be quoted as optional
17. Installation/Training/Application Support	Training on routine operation, maintenance and applications to be imparted at site. It is the responsibility of the vendors to ensure that all necessary essential accessory and ancillary items are quoted for carrying out the standardization, optimization and calibration for objective applications including standards, chemicals, gases and consumables. The supplied system should be complete in itself in all respect to take up the sample analysis at the IIT Kanpur premises.
18. Special Evaluation Criteria	1. Even if the respective bidders meet all above technical points, final evaluation will be done based on the quality of data on the samples that will be provided at the time of evaluation (if applicable). 2. Vendor/Manufacturer/Supplier should have at least 100 installations across the globe and the list of the same must be provided along with the technical bid.

Special Note: Vendor/supplier must provide authentic technical documents, application notes in proof of all above claims and all those documents should be available in the website also.

Bid validity:- 90 days
Schedule Delivery:- 60 days
Warranty:- comprehensive one year

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