

Dear Sir,

Kindly send a quote for the following item on CIP Bangalore basis. Your quotation should clearly indicate the terms of delivery, delivery schedule, payment terms etc. The tender should be submitted in two separate sealed envelopes - one containing the technical bid and the other containing the commercial bid, both of which should reach us, duly signed on or before 1700 hours, 24<sup>th</sup> April 2017.

**Please enclose a compliance certificate along with the technical bid.**

Yours Sincerely,

P S Anil Kumar  
Department of Physics

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Customized Analysis System (Chromatographic analyzer)

We are interested in the purchase of a chromatograph for the analysis of analytes such as CO, CO<sub>2</sub>, O<sub>2</sub>, CH<sub>4</sub>, liquid CH<sub>3</sub>OH, Ar, other C<sub>2</sub> molecules etc. along with liquid components based on methanol / aqueous solutions used in electrolysis in aqueous medium. Our studies would include electrochemical CO<sub>2</sub> reduction in liquid phase, Li batteries, supercapacitors etc. The analyzer / chromatograph will have to be used in conjunction with a Mass spectrometer (separately being procured). This will be a customized analyzer for gas / liquid phase components from an electrochemical cell.

Analyzer with two channels, one (coupled with methanizer and TCD) kept in an isothermal oven and another consisting of sampling valve, injection port and FID. No column required here. The methanizer output will be shared with the second channel (FID). The oven has to be heated by an external controller.

The system should be capable of analyzing H<sub>2</sub>, O<sub>2</sub>/Ar, N<sub>2</sub>, CH<sub>4</sub>, CO, CO<sub>2</sub>, C<sub>2</sub> molecules, H<sub>2</sub>S with TCD and the methanizer / FID to analyse CO<sub>2</sub>, CH<sub>4</sub> and CO

Two analysis channels required – one for hydrogen (and He) (nitrogen carrier gas) and another for the rest. Appropriate columns are to be provided.

Interface should be user-friendly; programmable controller; temperature range up to 450 C; Pneumatic control to be provided for columns and detectors; injectors, detectors (pressure control) 0-100 psi/min; 0-100 mL/min, 0-200 cm/sec or better specs.

Trap (charcoals); suitable ferrules, liners, glass liners should be included.  
Packed column injector.

FID Detector – Temperature range 100 – 450 C (1 C increment)

TCD Detector – Temperature range 100 – 350 C (1 C increment) with high sensitivity (minimum detection < 1ppm nonane)

Minimum detection limit for CO, ethylene, ethane, acetylene, oxygen, Ar, methane, nitrogen, carbon dioxide, hydrogen sulphide should be given in the quote. The limit should be very low and this will be a major consideration in deciding the model and make.

**Terms and conditions:**

1. The vendor should have a track record of having previously supplied similar equipment in India (please furnish the details).
2. The vendor should have qualified technical service personnel for the equipment.
3. The payment will be through confirmed irrevocable Letter of Credit.
4. The lead time for the delivery of the equipment should not be more than two months from the date of receipt of our purchase order.
5. The instrument must carry a comprehensive warranty of 3 years from the date of installation.