

THERMAL MASS SPECTROMETRISTS

Analytical consulting firm seeks two individuals experienced in the operation of multi-sector TIMS instruments. Experience with small particles also desirable. IMMEDIATE openings for one Senior level (Ph.D) and one Junior level (BS/MS) position.

Send Resume and Summary of Skills and Work Experience to:

c/o HR: MASS SPEC
McCrone Associates, Inc.

850 Pasquinelli Drive
Westmont, IL 60559-5531

<http://www.mccrone.com>

Fax: (630)887-7417

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EQUAL OPPORTUNITY EMPLOYER

SHAM, SAM, And Bacterial Communication

Lee van Hook, Munchausen University

A scanning acoustic microscope (SAM) - a nanomicrophone using a piezo-electric crystal, may be used to examine bacterial colonies, not just materials specimens to detect phonons and listen to propagating microfractures.

Since bacterial cell walls are rigid structures, they undergo mechanical distortions when channels open and close. This causes them to squeak and pop, each channel having its own sound. Channels and receptor molecules are all of different sizes and shapes, and therefore deform the cell wall in unique ways. This means that each channel makes a unique (if faint) sound when it passes a molecule through itself and this activity can be detected. Transport rates of uptake and excretion for the various compounds can then be calculated from the intensity of the sounds. Other bacteria can detect these sounds, most likely by mechanosensory pili or glycoproteins acting as mechanoreceptors. Possibly, regions of the cell wall may act as a piezo-electric "microphone", generating electrical potential gradients across the plasma membrane.

Bacteria can be quite noisy in a rich medium, and by cataloging this din, we have found that when bacteria "hear" other bacteria making taking-up-nutrient noises, the "listeners" start taking up similar compounds at greater rates. In essence, the bacteria are communicating the presence of food (pathogenic strains have a much meaner sound).

We are now in the process of constructing a scanning hyper-acoustic microscope (SHAM) that will allow sounds to be transmitted as well as received. This will obviously allow us to play back the sounds of nutrient up-take to the bacteria, stimulating the target bacteria into increasing their own uptake rates for similar molecules.

There is evidence that with stimulation at the "nutrient-rich" intensity levels and with sufficiently complex waveforms, bacteria tend to lose their discrimination, and take up molecules willy-nilly. The bacteria seem to interpret this as meaning "there's lots of good things here". So, by using such sound levels, we should be able to induce them to start taking up compounds with less-than-usual discrimination, and trick them into taking in marker compounds or bioengineered DNA, or perhaps into believing a bath of deadly antibiotics is instead a gourmet feast of sugars.

But of course it's not this easy. Apparently the sounds made by the different channels and receptors of different strains of bacteria are consistent within strains, and different between strains. Useful for identification, but complicating for communication. It's as if each strain has its own dialect. Anyone have a dictionary? ■

POSITION OPEN - IMMEDIATELY Electron Microscopist Technician

Electron microscopist needed in Naperville, Illinois to work in a well-equipped electron microscopy laboratory which provides problem solving and support of research on a wide variety of materials including catalysts and polymers. At least 3 years experience in electron microscopy required (SEM/EDS essential, TEM/EDXS desirable), including sample preparation, data acquisition and interpretation, and reporting. Send resume and salary expectations to:

Staffing & Employment Services
File AY-EMT
200 E. Randolph Drive
Mail Code 3408
Chicago, IL 60601

Resumes must be scannable
Equal Opportunity Employer

INSTITUTE OF MATERIALS RESEARCH AND ENGINEERING

National University of Singapore

Applications are invited to participate in the Scanning Electron Microscope Technology Development Project of the Instrumentation Programme. This project aims to develop new concepts in scanning electron microscopy and to investigate new industrial applications for these concepts.

The positions are as follows:

- 1. Research Fellow:**
Qualifications: Preferably Ph.D. or equivalent.
Experience: Several years of experience in electron optical design and scanning electron microscopy applications is preferred but not essential.
- 2. Research Associate:**
Qualifications: Bachelors or Masters in Engineering, Physics or equivalent.
Experience: In electron optics and scanning electron microscopy applications.
- 3. Research Associate:**
Qualifications: Bachelors or Masters in Engineering, Physics or equivalent.
- 4. Technologist:**
Experience: Several years experience in electronics and control systems.
- 5. Technologist/Programmer:**
Experience: Experience in PC programming preferred.

Interested applicants may submit their resumes to:

The Recruitment Officer (Instrumentation)
Institute of Materials Research and Engineering
National University of Singapore
10 Kent Ridge Crescent, Blk S7, Level 3
Singapore 119260

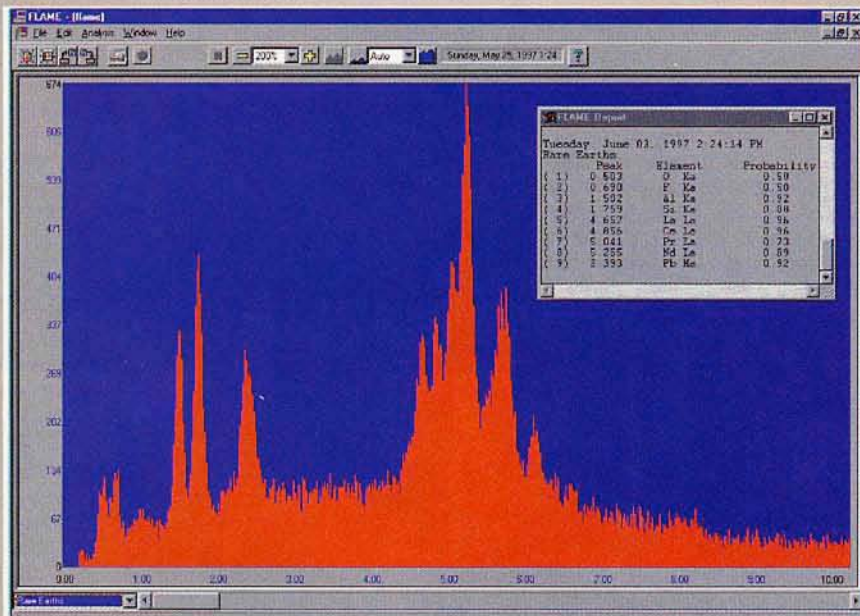
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