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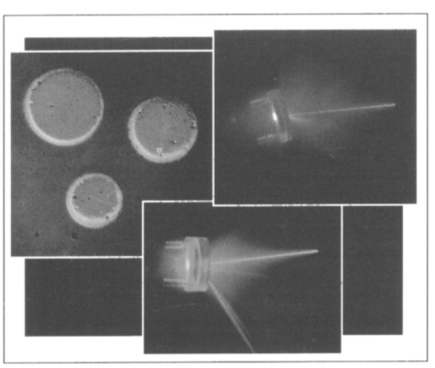
FROM DYNAMICS TO DEVICES: DIRECTED SELF-ASSEMBLY OF COLLOIDAL MATERIALS

MRS NEWS

ABSTRACTS



DEPARTMENTS

ON THE COVER: Diffraction of blue (488 nm) (Top Right) and green (514.5 nm) (Bottom Right) laser beams by a photonic crystal prepared from a crystalline face-centered-cubic array of polystyrene colloids.

(Left) Photonic-crystal chemical-sensing material. The photonic crystal normally diffracts violet light. The presence of three drops of a lead solution swells the photonic crystal and shifts the diffracted color to red. This is an example of a new chemical sensing motif.

For more information, see the article by S.A. Asher et al. on p. 44 of this issue.

About the Materials Research Society

The Materials Research Society (MRS), a not-for-profit scientific association founded in 1973, promotes interdisciplinary goal-oriented basic research on materials of technological importance. Membership in the Society includes over 12,000 scientists, engineers, and research managers from industrial, government, and university research laboratories in the United States and nearly 68 countries.

The Society's interdisciplinary approach differs from that of single-discipline professional societies because it promotes information exchange across the many technical fields touching materials development. MRS sponsors two major international annual meetings encompassing approximately 70 topical symposia, and also sponsors numerous single-topic scientific meetings. The Society recognizes professional and technical excellence and fosters technical interaction in local geographic regions through Sections and University Chapters.

MRS participates in the international arena of materials research through the International Union of Materials Research Societies (IUMRS). MRS is a member of the Federation of Materials Societies and is an affiliate of the American Institute of Physics.

MRS publishes symposium proceedings, *MRS Bulletin*, *Journal of Materials Research*, and other publications related to current research activities.

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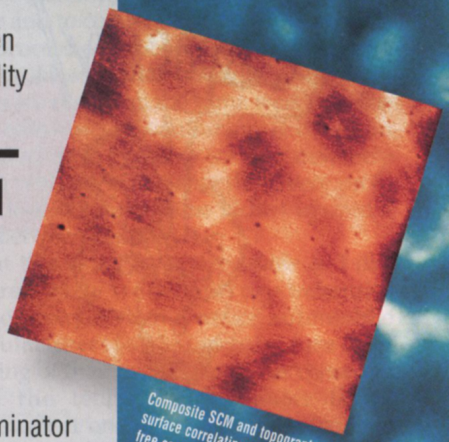
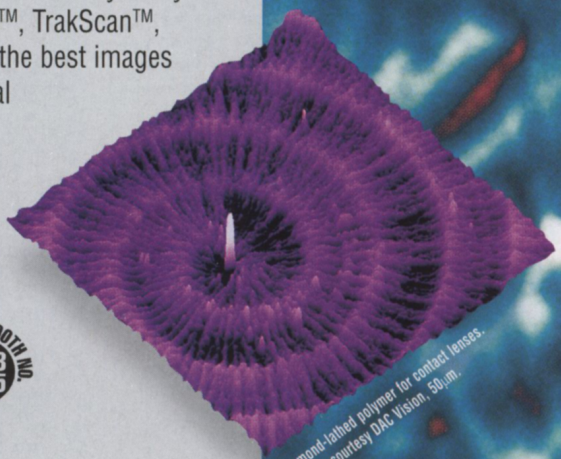


Composite SCM and topography of GaN surface correlating dislocation pits and free carrier concentration. 2.5μm

AFM phase image of liquid crystalline dendrimer showing birefringent "fan"-like domains*

The Dimension 3100 retains all of the capabilities of its predecessor, including versatile scanning capabilities and sample handling, easy operation in air or fluid, and the lowest noise floor and highest resolution of any large sample AFM. The Dimension 3100 is the AFM of choice for data storage, semiconductors, materials and surface science, CD/DVD, optics, magnetics, plastics/polymers, metals/alloys, thin films, biomaterials and virtually every other application. And our patented TappingMode™, TrakScan™, and Phase Imaging technologies will help you get the best images and measurements possible — even compositional information — on your most difficult samples.

So make the right choice — the Dimension 3100 — for proven productivity, reliability, quality, and performance from *the* world leader in AFM.



Diamond-lathed polymer for contact lenses. Sample courtesy DAC Vision. 50μm

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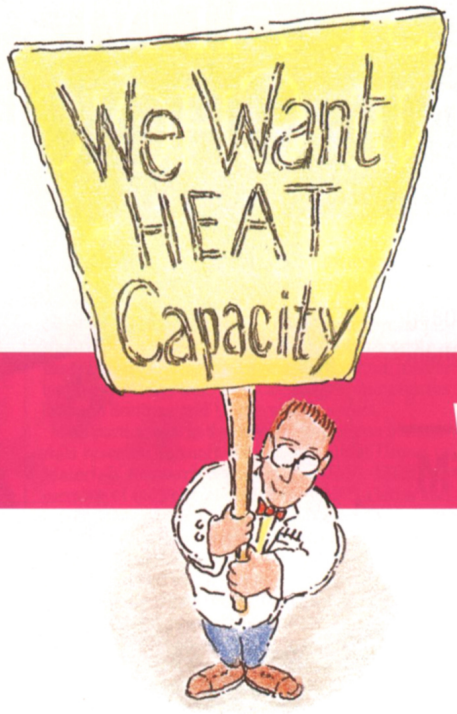
*Sample courtesy A.P. Shilov, Moscow State University. 25μm

Background: MFM image of a $Fe_{80}B_{16}Si_4$ ribbon revealing stress-induced magnetic structure that can lead to power losses in electrical transformers. 30μm scan courtesy M.E. Hawley, Los Alamos National Lab



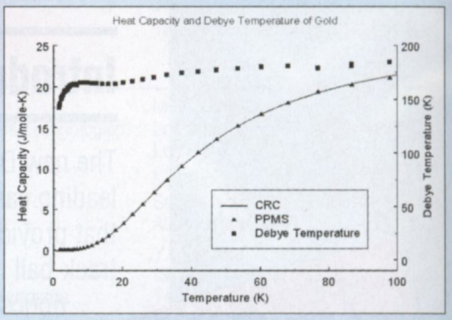
We listened.

The Quantum Design Smart PPMS Heat Capacity System:

- **Automated relaxation micro-calorimetry technique**
- **Easy sample mounting and introduction into integrated high vacuum system**
- **Two quantitative values (curve fit and sample coupling) for data quality assurance**
- **Automatic calculation and recording of the Debye temperature at each measurement point**
- **Auto-calibration procedure and built-in addenda subtraction**
- **Complete data acquisition electronics and analysis software**

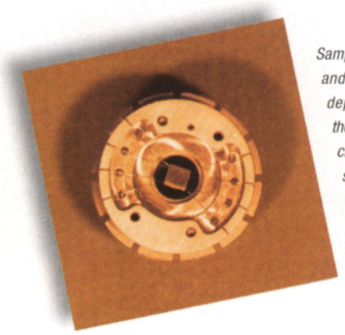
The QD Heat Capacity System's fully automated measurement/data analysis capabilities save countless hours and eliminate analytical errors.

A sophisticated fitting technique called the *two-tau model* enables the system to accurately simulate the effect of heat flow between the micro-calorimeter chip and the sample (tau1), as well as the heat flow between the chip and the sample mount (tau2).

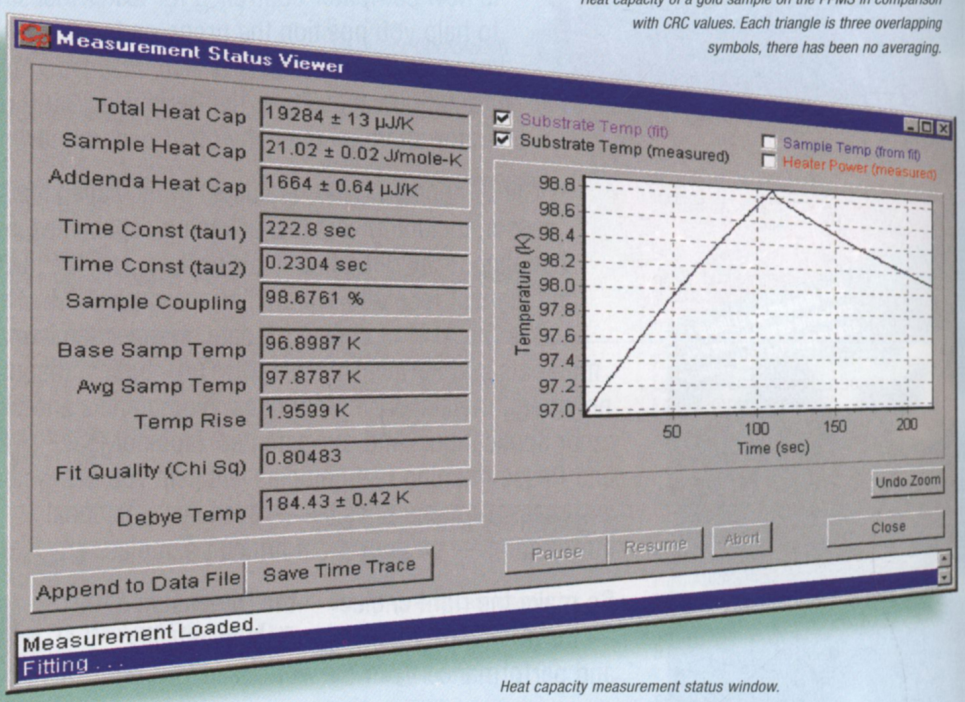


Heat capacity of a gold sample on the PPMS in comparison with CRC values. Each triangle is three overlapping symbols, there has been no averaging.

Introducing the world's first Smart Heat Capacity System, built on the proven architecture of Quantum Design's popular Physical Property Measurement System (PPMS). This system is designed with three things in mind: extraordinary functionality, a high degree of accuracy, and unprecedented ease of use.



Sample mount: Heater and thermometer are deposited directly on the micro-calorimeter chip for improved sample coupling and reliability.



Heat capacity measurement status window.

The Heat Capacity System comes with an intelligent, user-friendly software package which includes built-in data subtraction to correct for the contribution of elements extraneous to the sample. Sophisticated algorithms calculate and report the percent of coupling of the sample to the chip, and this data is used to determine the sample's heat capacity.

You asked for an accurate, flexible heat capacity system. As usual, Quantum Design was listening.

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