

## MRS-TMS Regional Meeting Explores Semiconductor-Based Heterostructures

A two-day regional meeting, "Semiconductor-Based Heterostructures: Interfacial Structure and Stability," cosponsored by the Materials Research Society and The Metallurgical Society addressed a topic of increasing significance in the development of future electronic devices. The meeting was held at AT&T Bell Laboratories, Murray Hill, NJ, May 1-2, 1986.

Individual sessions focused on a variety of topics of high current interest, including interfacial stability, growth of heterostructures (especially among Si, Ge, and GaAs), passivation, and metallization of compound semiconductors.

Excellent presentations and posters, and good discussions marked the meeting, and the strong attendance (175) reflected the high level of interest. Dr. William P. Slichter, Executive Director of the Research, Materials Science and Engineering Division at AT&T Bell Laboratories, presented a fascinating talk at the conference dinner, drawing on his experiences over some 36 years at Bell Laboratories.

The comfortable atmosphere of the meeting and its technical success derived in large measure from the effective organization of Martin Green (AT&T Bell Laboratories), who chaired the Organizing Committee. Marty is also editor of the proceedings volume, to be published by TMS. See upcoming issues of the BULLETIN for information on the proceedings.

The unusual success of this regional meeting owed much to the cooperative efforts of TMS and MRS in sponsoring and publicizing the event.

J.E.E. BAGLIN  
MRS member of  
Organizing Committee

## MRS Cosponsors GFRC Symposium

The International Symposium on the Durability of Glass Fiber Reinforced Concrete (GFRC) was held November 13-15, 1985 in Chicago, IL. The symposium was sponsored by the Prestressed Concrete Institute (PCI) and cosponsored by the American Ceramic Society, the American Concrete Institute, and the Materials Research Society.

This symposium, consisting of 28 papers, provided a focus for current information on developments relating to the inservice durability characteristics of GFRC products.

The first two sessions provided background information on the main question to be addressed by the symposium—the GFRC durability problem. In the first of these sessions, three speakers intimately

associated with the development of the industry summarized the early history of GFRC development and current industry practices and perspectives worldwide.

In the second session three internationally recognized authorities provided fundamental background on: the technology of glass fiber design and manufacture as applied to GFRC-specific fibers; the processes of portland cement hydration chemistry, as they influence the characteristics of the internal structure and chemistry of GFRC; and the current, limited understanding of the complex mechanics governing GFRC systems. The session was concluded with an assessment of the current reliability of GFRC products by a technically sophisticated customer.

The following three sessions addressed the durability problem, the mechanisms responsible, appropriate tests and test methods, and new and modified GFRC technologies developed to avoid it.

The main points established at the symposium can be summarized as follows:

1. This appears to be a critical time for the establishment of large-scale usage of GFRC. Despite progressively increasing use in the United States, expected large-scale adoption has been stymied by the question of durability.

2. The original "BRE/GRC" formulation with CemFIL-1, and its near relatives, are subject to loss of composite flexural and tensile strengths down to little more than those of the matrix, and loss of essentially all the strain capacity. These losses occur in every case of exposure to wet conditions, given time.

3. The importance of retaining strain capacity, especially for sandwich panels but also for imperfectly fixed single-skin products, has not been sufficiently stressed in the past.

4. The fundamental cause of strain capacity loss has been a major dispute. One group of researchers focuses on alkaline attack on the glass. Another group suggests that (a) the loss of strain capacity occurs because of deposition of calcium hydroxide and other cement hydration products between the individual fibers of the strands and consequent bonding of all the individual fibers to the matrix, and (b) the loss of composite strength, at least with alkali-resistant glass composites, is mostly due to the same effect; alkali attack on the glass is perceived as only a minor contribution.

5. CemFIL fibers made with identical glass but a modified coating (marketed as CemFIL-2) show significantly slower and less severe strength and strain capacity losses. The cause of the benefit may be that an active agent in the new size "reduces the rate of alkali/glass chemical reaction" or that the active agent(s) in the size may

interfere with calcium hydroxide precipitation between the fibers, at least at early ages.

6. Many GFRC formulations different from "BRE/GRC" are possible, and many are being explored and some used in practice. These formulations are of interest for potentially reducing or completely eliminating the loss of strength and strain capacity.

• Some of the more prominent alternate systems discussed at the symposium include:

- Incorporation of polymer lattices.
- Use of higher percentage of glass fiber.
- Use of new glass formulations, including higher ZrO content glasses and other novel glasses.

- Matrix modification and substitution, including (1) the use of the special CGC cement developed by Chichibu Cement Co., (2) the potential use of metakaolinite as an effective admixture to portland cement, and (3) the potential use of slag and silica fume incorporations.

A system of incorporating a concentrated suspension of silica fume directly into the spaces between the glass fibers preventing local deposition of calcium hydroxide and presumably lowering local alkalinity.

The 356-page proceedings volume, *Durability of Glass Fiber Reinforced Concrete Symposium*, is available from Prestressed Concrete Institute, 201 North Wells Street, Chicago, IL 60606.

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## North Carolina Section Student Paper Awards and Meeting

The North Carolina Section will award \$250 in prizes for three student papers to be given at its November 24, 1986 section meeting on materials processing.

The awards are in memory of Dr. James Crawford, formerly associated with Oak Ridge National Laboratory and then with the Physics Department of the University of North Carolina at Chapel Hill. Crawford was one of the original founders of the North Carolina Section, and he worked on building the materials science program at the University of North Carolina.

The meeting agenda will include sessions on processing of ceramics and solid-state materials, and on polymer processing. For information about the awards or the meeting, contact Hans Conrad (919) 737-7433.