

The background of the cover is a high-magnification micrograph of a geosynthetic material. It shows a dense, interwoven network of fibers. The fibers are light-colored, possibly white or light grey, and have a rough, fibrous texture. They are oriented in various directions, creating a complex, non-uniform pattern. The fibers appear to be interconnected at various points, forming a mesh-like structure. The overall appearance is that of a highly textured, fibrous material, likely used for geotechnical applications.

Geosynthetics: Microstructure and Performance

Ian D. Peggs
editor



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Foreword

The ASTM Symposium on Microstructure and the Performance of Geosynthetics was held in Orlando, Florida, on 27 January 1989. ASTM Committee D-35 on Geotextiles, Geomembranes, and Related Products sponsored the event. Ian D. Peggs, GeoSyntec Inc., served as symposium chairman and has edited this volume.

Overview

This ASTM symposium was initiated as the result of a desire and apparent need to institute a rational technical base for an understanding of the performance and durability of geosynthetics. It was possibly the first meeting approaching the question of geosynthetics durability from the materials/polymer science and engineering aspect. In this respect it was timed very well, since it coincided with the first meeting in North America of the International Organization for Standardization (ISO) TC38/SC21 Subcommittee on Geotextiles and the first meeting of that Subcommittee's Working Group 5 (WG5) on the Durability of Geotextiles (and Related Products).

The international flavor of the symposium was apparent by the representation of six countries among the authors of the fourteen presentations.

The term *microstructure* was originally intended by the symposium organizers to signify factors such as: (1) the chemical structure of the basic polymer, (2) the physical structure of crystalline and amorphous regions, and (3) additives for oxidation and ultraviolet light resistance. But it became apparent as abstracts were received that to many of those working with geosynthetics, *microstructure* meant the porous structure, fiber/fiber interaction, and service environment/fiber interactions that could occur. Consequently, the papers presented represent an equal proportion of the behavior of the fundamental building blocks from which geosynthetics are fabricated and the interaction of the building blocks with themselves and the environment.

The necessity for understanding the performance of geosynthetics is clearly defined in the paper by R. E. Landreth of the U.S. Environmental Protection Agency. An incredible amount of confidence has been placed in the capability of geosynthetics to perform adequately over long periods of time in very critical applications, such as for liners containing hazardous wastes. If supporting technical data are not generated to confirm this confidence, and if data are not generated to guard against the inevitable deficiencies of geosynthetics, then this confidence will be severely questioned. We must be ready for the surprises that will occur.

This symposium is a first step towards understanding the technical performance of geosynthetics. We hope it will catalyze further research work and many more technical meetings on the same topic.

I. D. Peggs

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and editor

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