Dr. Moshe Gottlieb  
Frankel Professor of Chemical Engineering  
Ben Gurion University, Beer Sheva, Israel

Dr. Gottlieb received his B.Sc. in Chemical Engineering from the Technion in Haifa, and his Ph.D. in Chemical Engineering, with a minor in Rheology, from University of Wisconsin-Madison. He joined the Chemical Engineering Department at Ben-Gurion University in 1980. His current research interests include rheology, polymer solution and suspension, polymer-solid interactions, molecular organization in supramolecular systems and gelation phenomena. His present research activity is related to two main topics: (i) Polymers in the vicinity of surfaces and interfaces, including the study of polymer filler interactions, the effect of surface chemistry on polymer adsorption, polymers in the vicinity of interfaces in relation to polymeric surfactants and the effect of surfaces on polymer crystallization; and (ii) Gelation phenomena and especially physical gelation as result of microdomain confinement. Dr. Gottlieb is the author of numerous publications.

“Block Copolymers at Interfaces – Statics, Kinetics and Rheology”

During the last decades, the interfacial activity of amphiphilic block copolymers has been widely studied. The interest stems from the peculiar characteristics of these systems: they combine the amphiphilic nature of small molar-mass surfactants with the conformational and compositional richness of macromolecules. As result, their behavior at fluid interfaces can lead to tunable properties with significant implications in many scientific, industrial and medical applications where multiphasic systems are present. For example, viscoelastic properties at the interface can play a relevant role in the processing and stability of emulsions and foams. Generally, block copolymers exhibit a wide range of rheological properties and interfacial activity, depending on several parameters. Yet, the relation between the molecular architecture, size and chemistry and the behavior at the interface is not clear. In addition, fundamental understanding of the behavior of some chemically simpler molecules may provide the tools for understanding interfacial behavior of structurally more complex biopolymers.

In this study, we examined a series of polyethyleneoxide –b-polydimethylsiloxane (PEO-PDMS) diblock copolymers and PEO-PDMS-PEO triblock copolymers at different interfaces. These highly amphiphilic copolymers show some remarkable features.

Results will be discussed in terms of the effects of architecture (diblock vs. triblock), chain length, block size and block size ratio (A/B) on interfacial properties, dynamics and rheology.