



סמינר SEMINAR

Emulsion-Templated Shape-Memory Polymer Foams: Effects of Monomers, Stabilization, and Crosslinking

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PolyHIPEs are porous polymers polymerized within the external phase of high internal phase emulsions (HIPEs). Shape memory polymers (SMPs) are polymers that can adopt an imposed temporary shape and then recover their original shape on exposure to an external stimulus. SMP polyHIPEs (SMPHs) offer higher recoverable deformations compared to dense SMPs. The objective of this work was to investigate the effects of the monomer composition and the stabilization-crosslinking strategies on the SMPH properties. Those strategies can include non-reactive vs. reactive surfactants, crosslinking comonomers, and stabilizing-crosslinking, surface-modified silica nanoparticles (MNPs).

PolyHIPEs based on stearyl acrylate (A18), which has crystallizable, side-chains, using MNP stabilization and crosslinking exhibited a crystallinity of 36%, a fixity ratio of 100%, and a recovery ratio of $\sim 100\%$ at 57°C . A18 was replaced by monomers with longer side chains and MNPs were replaced by a combination of crosslinking comonomers with either a non-reactive or a reactive surfactant. Surfactant-stabilization produced significantly smaller void sizes, around $10\ \mu\text{m}$ instead of the $\sim 500\ \mu\text{m}$ from MNP-stabilization. Using these approaches, the crystallinity was varied from 20 to 48% (the fixity ratio was $\sim 100\%$), the recovery temperature varied from 30 to 70°C , and the recovery ratio was usually over 90%. The effects of the monomers, and the stabilization-crosslinking strategies on these parameters will be discussed.

Supervisor: Prof. Michael S. Silverstein

ההרצאה תתקיים ביום ראשון, ה' - 2 באוקטובר 2022 בשעה 14:30
באודיטוריום ע"ש דויד וואנג, בניין מידן, קומה 3

**The seminar will take place on Sunday, Oct 2nd, 2022 at 14:30
David Wang Auditorium, 3rd floor Dalia Meidan Bldg.**

כיבוד קל יוגש לפני הסמינר
Light refreshments will be served before the seminar