



סמינר SEMINAR

Emulsion-templated Interpenetrating Polymer Networks with Degradable Components for Hierarchical Porosity

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Hierarchically porous polymers are of interest for many applications including column packing and water purification. Templating within water-in-oil high internal phase emulsions (HIPEs) with two mutually exclusive polymerization-crosslinking reactions can generate interpenetrating polymer networks (IPN) within macroporous (>50 nm) polyHIPEs (PHs). A styrenic polymer that can be hypercrosslinked for microporosity (<2 nm) can be combined with a poly(urethane urea) (PUU) that can be degraded for mesoporosity (2-50 nm). The objective was to synthesize hierarchical porosity within IPN-PHs. The framework was a copolymer of vinylbenzyl chloride (VBC) and divinylbenzene (DVB) (free radical polymerization) and PUU was based on polycaprolactone (PCL) (step-growth polymerization). The macromolecular structures, porous structures, and properties of the resulting PHs were characterized. The highly porous PHs had densities ranging from 0.15 to 0.40 g/cm³ and open-cell structures with voids of ~ 10 μm . The solubility of the PUU in dimethylformamide indicated that semi-IPN (only one crosslinked polymer) were formed. Hypercrosslinking partially dissolved the PUU, generating mesopores as well as micropores. The micropore diameters, ranging between 0.2 and 1.0 nm, decreased with increasing P(VBC-co-DVB) content and the BET (Brunauer, Emmett, Teller) specific surface area increased with the P(VBC-co-DVB) content, reaching 629 m²/g for P(VBC-co-DVB) PH. Etching the PUU generated additional macroporosity and a population of macropores between 0.6 and 1.0 μm .

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ההרצאה תתקיים ביום ראשון, ה-17 באוקטובר 2021 בשעה 14:30
הסמינר יתקיים בזום

**The lecture will take place on Sunday, October 17, 2021 at 14:30
Seminar by Zoom**

<https://technion.zoom.us/j/94139721460>