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Mechanical Properties of Organized Microcomposites Fabricated by Interference Lithography[1] SRIKANTH SINGAMANENI, SEHOON CHANG, Georgia Institute of Technology, JI-HYUN JANG, MIT, WHITNEY DAVIS, Georgia Institute of Technology, EDWIN THOMAS, MIT, VLADIMIR TSUKRUK, Georgia Institute of Technology, GIT/MIT COLLABORATION — We demonstrate that organized, porous, polymer microstructures with continuous open nanoscale pores and sub-micron spacings obtained via interference lithography can be successfully utilized in a highly non-traditional field of ordered microcomposites. Organized microcomposite structures are fabricated by employing two independent strategies, namely, capillary infiltration and in situ polymerization of the rubbery component into the porous glassy microframes. The mechanical properties and ultimate fracture behavior of the single and bicomponent microframes are investigated at different length scales. The ordered single and bi-component microstructures with high degree of control over the microscopic organization of the polymeric phases result in excellent mechanical properties. Combining hard and soft polymer components provides multifunctional materials and coatings with synergetic properties and is frequently utilized for design of advanced polymeric composites.

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