

高分子学会九州支部 外国人講演会

この度、高分子学会九州支部主催の外国人講演会を下記の通り開催いたします。

日時：7月6日（土）13：00-15：00

場所：九州大学・伊都キャンパス ウェスト4号館315室（物質系5番講義室）
〒819-0395 福岡市西区元岡744番地

講師：Prof. Alfred J. Crosby （University of Massachusetts Amherst）

題目：Mechanics of Ultra-thin Polymer Glasses

Abstract: The properties of polymer glasses have been studied classically due to their importance for a wide range of technologies; however, there is increasing need and demand to use these materials in geometries where dimensions approach the length scale of an individual polymer chain. Significant efforts recently have provided insight into how physical properties, especially the glass transition temperature, can change as a function of dimensional confinement; however, there has been significantly less development with regards to mechanical properties, which are especially critical for performance. We present results using two recently-developed experimental methods, called The Uniaxial Tensile Tester for Ultra-Thin films (TUTTUT) and TUFF (Tensile tester for Ultra-thin Freestanding Films), which allow for the direct measurement of the complete stress-strain relationship for uniaxial stretching of ultra-thin polymer films as thin as 12nm. Our results reveal a new, thickness-controlled transition from craze deformation processes to shear deformation zones for films that are less than 30nm in thickness. We relate this deformation mechanism transition to other property changes in bulk and thin film polymer glasses. This method and these results not only provide fundamental insight into the physics of polymer materials but also new opportunities for designing ultra-thin film materials with enhanced performance.