

Mechanical properties of polyimide/polysilsesquioxane (PI/PSSQ) hybrid films with meso/macro double porous structure

안준현*, 김경일, 이준영¹, 김중현
연세대학교; ¹University of Liverpool
(jhan@yonsei.ac.kr*)

First, organic-inorganic hybrid multi-porous films were prepared for low dielectric constant. A novel synthetic process for multi-porous polyimide(PI) / poly(methyl silsesquioxane)(PSSQ) hybrid material has been studied via supercritical CO₂ technology. The end groups of PI precursors were modified by coupling agent to be hybridized with alkoxy silanes and became PMSSQ precursors. The PI precursor segment was imidized and micro-pores were developed by removal of by-product, CO₂ via supercritical CO₂ media. The PMSSQ precursor segment was cured and nano-pores were generated by supercritical extraction. Even if by this novel synthetic, multi-porous pores were generated successfully, mechanical properties was poor a little as dielectric constant was low due to multi-pore generation. In this work, hybrid multi-porous films were investigated in terms of mechanical properties such as hardness, modulus and elastic recover for optimum mechanical condition by Nano Indenter XP. The hardness was lower in proportion as decreasing of pore size and density.