

Suspended Polymer Microwire on a Quartz Resonator

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Free standing microwires and membranes of polystyrene (PS) or polymethylmethacrylate (PMMA) were prepared by electrospinning and spin-coating, respectively. Each polymer structure was attached to the two prongs of a quartz tuning fork (QTF) to form a polymer bridge. Exposure of PS membrane-, PMMA membrane-, and PMMA microwire-coated QTFs to ethanol vapor decreased the modulus of the polymer membrane, resulting in the decrease in the resonance frequency. However, exposure of a PS microwire-coated QTF to ethanol vapor resulted in an increase in the resonance frequency. We tentatively attributed the increase in the modulus of the PS microwire to the contraction of the aligned PS chains.