

A process for making low optical density polymers and
copolymers for photoresists and optical applications.

Abstract

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Polymers comprising poly(4-hydroxystyrene) and/or substituted poly(4-hydroxystyrene) are produced by polymerizing 4-acetoxystyrene and/or substituted 4-acetoxystyrene monomers, with or without other comonomers,
10 and subsequently performing transesterification. Preferably, the polymers are produced using at least one alcohol as a reaction medium, a chain transfer agent and a transesterification reactant. It is appropriate: to use an initiator which does not comprise a substantially
15 absorbant structure over the 240 to 260 nm range or to use an initiator concentration of less than about 3 mole % of the monomer(s); to obtain a polymerization conversion of the initial polymerization monomers of at least about 90% by weight, or to remove residual monomer(s) from the reaction
20 medium prior to transesterification; to obtain a transesterification conversion of the polymerized monomers of at least 85% by weight; and to avoid the use of transesterification catalysts which can cause the formation of chemical structures which can absorb over the 240 to 260
25 nm radiation wavelength range. The target polymers have low optical density (absorbance) over a wavelength range from 240 to 260 nm, as well as low optical density over the near UV and visible spectrum (310 to 800 nm); and are useful as photoresist components for use in combination with deep UV,
30 X-ray, and E-Beam imaging systems.