

Abstract

To synthesize nonlinear optical polyimides exhibiting high nonlinearity and high thermal stability, a new monomer bearing phenylenediamine and a diazo benzene-type nonlinear optical chromophore (compound **1**) was synthesized and polymerized with 4,4'-(hexafluoroisopropylidene)diphthalic anhydride. This diazo chromophore possesses a microscopic optical nonlinearity larger than either the Disperse Red 1 or DANS chromophores. Copolymerization of compound **1** and 1,4-diaminophenylene with 4,4'-(hexafluoroisopropylidene)diphthalic anhydride yielded copolyimides with higher glass transition temperatures. These polyimides exhibit large electrooptic coefficients, $r_{33} \sim 14\text{--}35$ pm/V. The second harmonic measurements indicate long-term stability of the dipole orientation (>800 h at 100 °C) for these polyimides.