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HIGHLY EFFICIENT NONLINEAR OPTICAL POLYIMIDES

ABSTRACT

5 A method for forming a polyamic acid having nonlinear optical (NLO) or pre-NLO side chains, which method includes the steps of:

(1) providing a bis-(aromatic dicarboxylic acid anhydride) containing at least one NLO or pre-NLO side chain having the structure represented by:

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D-R-A

wherein D, R and A form a delocalized resonance configuration in which R is a pi-conjugated non-centrosymmetric moiety, A is hydrogen or an electron withdrawing moiety and D is an electron donating moiety covalently linked to the bis-(aromatic dicarboxylic acid anhydride); and

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(2) reacting the bis-(aromatic dicarboxylic acid anhydride) with an aromatic diamine to form a polyamic acid having NLO or pre-NLO side chains. Methods for preparing polyamic acids having NLO or pre-NLO side chains by reacting aromatic diamines having NLO or pre-NLO side chains with bis-(aromatic dicarboxylic acid anhydrides) are also disclosed. Methods of forming the polyamic acids into polyimides having NLO side chains are also included.

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