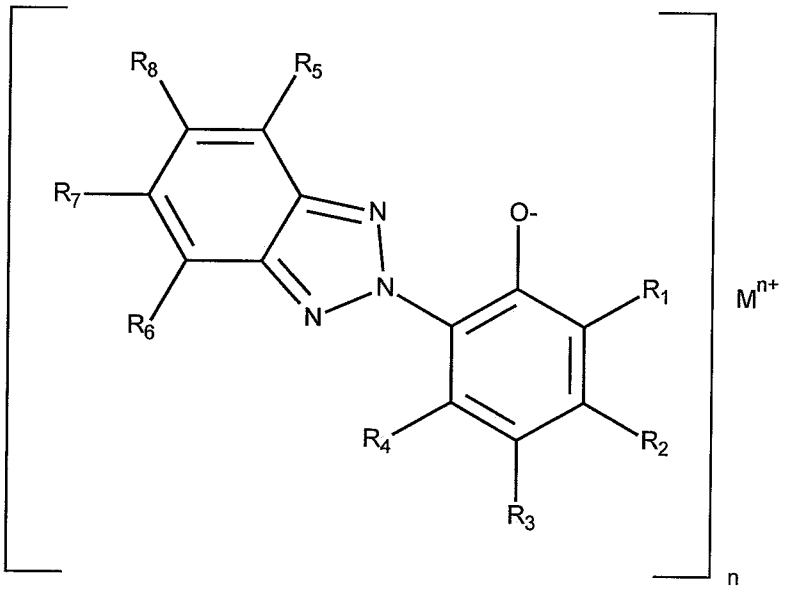
atom with a valency of n; and the macromolecular assembly comprises 2-4 repeat units. A wide variety of polymers that are free of ester linkages can be used in the polymeric compositions.

In one aspect, there is provided a polymeric composition comprising:

at least one polymer; and

an additive comprising at least one macromolecular salt composition, the macromolecular salt composition comprising an assembly of metal salts comprising repeat units of a substituted benzotriazole phenolate anion and a metal cation with the structure:



wherein each R^1, R^2, R^3, R^4, R^5, R^6, R^7, and R^8, independently comprises a hydrogen atom, an alkyl group, an alkenyl group, an aryl group, a halogen atom, or a substituted heteroatom group comprising a $-B(OR^{18})(OR^{19})$, a $-SiR^{20}{}_3$, a $-CH_2-R^9$, an $-O-R^9$, a $-N-R^9R^{10}$, a $-S-R^9$, a $-S(O)-R^9$, or a $-S(O)_2-R^9$ group, where S(O) is a sulfinyl group S=O, and $S(O)_2$ is a sulfonyl group O=S=O, R^9 comprises a hydrogen atom, an alkyl group, an alkenyl group, an aryl group, or a heteroatom-containing group comprising one or more oxygen, nitrogen, sulfur, or phosphorous atoms, wherein the $-B(OR^{18})(OR^{19})$, $-SiR^{20}{}_3$, $-CH_2-R^9$, $-O-R^9$, $-N-R^9R^{10}$, $-S-R^9$, $-S(O)-R^9$, or $-S(O)_2-R^9$ group may be neutral or anionic, and R^{10} comprises a hydrogen atom, an alkyl group, an alkenyl group, an aryl group, or a heteroatom-containing group comprising one or more oxygen, nitrogen, sulfur, or phosphorous atoms, or R^9 and R^{10} together with the atoms connecting form a heterocyclic ring structure, R^{18} and R^{19} are independently hydrogen atoms, alkyl groups or R^{18} and R^{19}

together with the atoms connecting form a heterocyclic ring structure, each R^{20} independently comprises an alkyl group;

n is an integer of 1-4;

and M comprises a metal atom with a valency of n;

and the macromolecular assembly comprises 2-4 repeat units;

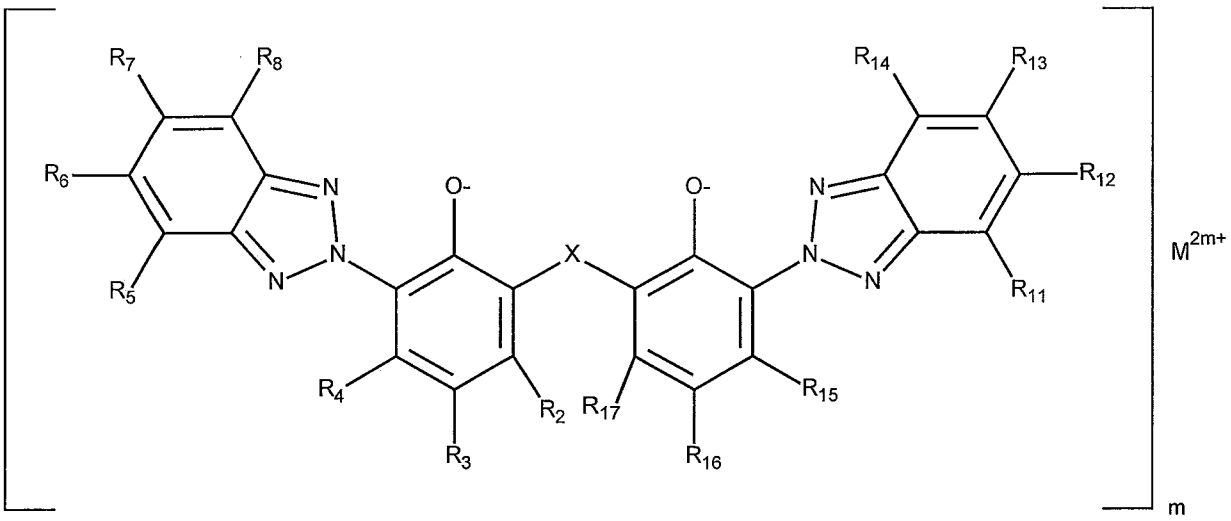
wherein each R^1, R^2, R^3, R^4, R^5, R^6, R^7, and R^8, independently comprises a hydrogen atom, an alkyl group, an alkenyl group, an aryl group, a halogen atom, or a substituted heteroatom group comprising a $-CH_2-R^9$, an $-O-R^9$, a $-N-R^9R^{10}$, a $-S-R^9$, $-S(O)-R^9$, or a $-S(O)_2-R^9$ group, wherein R^9 comprises a hydrogen atom, an alkyl group, an alkenyl group, an aryl group, or a heteroatom-containing group comprising one or more oxygen, nitrogen, sulfur, or phosphorous atoms, wherein the $-CH_2-R^9$, $-O-R^9$, $-N-R^9R^{10}$, $-S-R^9$, $-S(O)-R^9$, or $-S(O)_2-R^9$ group may be neutral or anionic, and R^{10} comprises a hydrogen atom, an alkyl group, an alkenyl group, an aryl group, or a heteroatom-containing group comprising one or more oxygen, nitrogen, sulfur, or phosphorous atoms, or R^9 and R^{10} together with the atoms connecting form a heterocyclic ring structure;

n is an integer of 1-4; and

M comprises a metal atom with a valency of n; and

the macromolecular assembly comprises 2-4 repeat units.

In other embodiments of the polymer composition, the repeat unit of the macromolecular salt has the structure:



where X comprises a $-CH_2-$, -O-, -S-, -S(O)-, $-S(O)_2-$, or $-NR^{10}-$ linking group where R^{10} comprises a hydrogen atom, an alkyl group, or an aryl group, each R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^{11}, R^{12}, R^{13}, R^{14}, R^{15}, R^{16}, and R^{17}, independently comprises a hydrogen atom, an alkyl group, an alkenyl group, an aryl group, or a halogen atom; m = 0.5, 1, or 2; M is a metal ion with a valency of 2m such that M is lithium sodium or potassium when m = 0.5; M is calcium, magnesium, or cobalt, when m = 1; and M is vanadium or titanium when m = 2.

In another aspect, there is provided a method of preparing a polymer composition comprising:

providing at least one polymer;

providing at least one macromolecular substituted benzotriazole phenolate salt; and

mixing the polymer and at least one macromolecular substituted benzotriazole phenolate salt to form a polymer composition.

Brief Description of the Drawings

The present application may be more completely understood in consideration of the following detailed description of various embodiments of the disclosure in connection with the accompanying drawings.

Figure 1 shows a view of NMR data for a precursor and for an embodiment of an article of this disclosure.