CLAIMS

What is claimed is:

1. A method of improving Mooney stability of a brominated elastomer, the method comprising:

neutralizing a brominated elastomer effluent with a neutralizing agent and water to form a neutralized effluent comprising a hydrocarbon solvent;

removing the hydrocarbon solvent from the neutralized effluent to form a brominated elastomer slurry; and

separating a brominated elastomer from the brominated elastomer slurry,

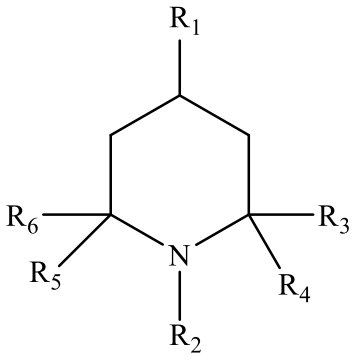
wherein an amine-functional hindered amine stabilizer (HAS) and an acid scavenger are added i) to the brominated elastomer effluent prior to neutralizing, ii) when neutralizing the brominated elastomer effluent, or iii) to the neutralized effluent prior to removing the hydrocarbon solvent , together or separately, and

wherein the amine-functional HAS comprises a HAS nitrogen atom having a first pKa and the acid scavenger comprises a protonatable atom with a pKa greater than the pKa of the HAS nitrogen atom.

2. The method of claim 1, wherein the separated brominated elastomer has an aged Mooney viscosity of not more than about 10 Mooney units higher than an initial Mooney viscosity of the separated brominated elastomer.

3. The method of claim 1, wherein the acid scavenger is an amine-functional acid scavenger such that the protonatable atom is a nitrogen atom, and wherein at least about 500 wppm of amine-functional HAS and at least about 1000 wppm of amine-functional acid scavenger are added.

4. The method of claim 1, wherein the amine-functional HAS comprises one or more compounds having a moiety with a piperidinyl nitrogen according to formula (I):



(I)

wherein:

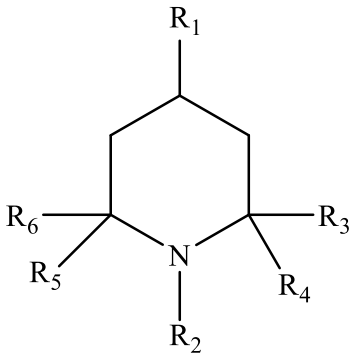
R_1 is a hydroxyl or a heteroatom-containing linker connecting to one or more other moieties of formula (I) at a corresponding R_1 or at an R_2 of each other moiety;

R_2 is hydrogen, a C_1-C_8 optionally heteroatom-containing hydrocarbon moiety having a carbon atom single-bonded to the piperidinyl nitrogen, or is a heteroatom-containing linker connecting to one or more other moieties of formula (I) at a corresponding R_2 or at an R_1 of each other moiety; and

R_3, R_4, R_5, and R_6 are independently a C_1-C_6 hydrocarbon moiety.

5. The method of claim 4, wherein the amine-functional HAS comprises 4-hydroxy-2,2,6,6-tetramethyl-1-piperidineethanol or an esterified dimer or polymer thereof with R_1 being connected as a heteroatom-containing linker to another moiety of formula (I) at an R_2 of the other moiety.

6. The method of claim 1, wherein the amine-functional HAS comprises one or more compounds having a moiety with a piperidinyl nitrogen according to formula (I):



(I)

wherein:

R_1 is a hydroxyl, a C_1-C_{18} optionally heteroatom-containing hydrocarbon moiety, or an optionally heteroatom-containing linker connecting to one or more other moieties of formula (I) at a corresponding R_1 or at an R_2 of each other moiety;

R_2 is hydrogen, a C_1-C_8 optionally heteroatom-containing hydrocarbon moiety having a carbon atom single-bonded to the piperidinyl nitrogen, or is a heteroatom-containing linker connecting to one or more other moieties of formula (I) at a corresponding R_2 or at an R_1 of each other moiety;

R_3 and R_6 are each hydrogen; and

R_4 and R_5 are each independently a C_3-C_{10} optionally heteroatom-containing hydrocarbon moiety.

7. The method of claim 1, wherein the acid scavenger is an amine-functional acid scavenger such that the protonatable atom is a nitrogen atom, and wherein the amine-functional acid scavenger comprises one or more compounds having a formula:

$$NR_7R_8R_9,$$

wherein:

R_7 and R_8 are each independently a C_2-C_{18} optionally heteroatom-containing hydrocarbon moiety; and

R_9 is either hydrogen or a C_1-C_{18} optionally heteroatom-containing hydrocarbon moiety.

8. The method of claim 7, wherein the amine-functional acid scavenger comprises dioctylamine.

9. The method of claim 1, wherein the solvent comprises pentane, hexane, heptane, cyclohexane, cyclopentane, mono-, di-, or tri-halogenated C_1 to C_6 paraffinic hydrocarbon, or a combination thereof.

10. A brominated elastomer prepared by the method of claim 1.

11. An article comprising the brominated elastomer of claim 10, wherein the article is a tire innerliner or a tire bladder or is incorporated as a layer into a tire, a bladder, a hose, a belt, a pneumatic spring, or a vehicle body mount.

12. A brominated elastomer composition comprising:

a copolymer made from a C_4 to C_7 isomonoolefin and at least one monomer or polymerizable unit selected from isoprene and alkylstyrene; and

a Mooney stabilizer comprising an amine-functional hindered amine stabilizer (HAS) and an acid scavenger,

wherein the brominated elastomer composition has an initial Mooney viscosity of no more than about 10 Mooney units lower than an aged Mooney viscosity after being subject to 80°C for seven days.

13. The brominated elastomer composition of claim 12, wherein the acid scavenger is an amine-functional acid scavenger such that the protonatable atom is a nitrogen atom.

14. The brominated elastomer composition of claim 12, wherein the Mooney stabilizer additive consists essentially of the amine-functional hindered amine stabilizer (HAS) and the amine-functional acid scavenger.

15. The brominated elastomer composition of claim 12, further comprising 0.001 to 0.2 mol% of an allylic alcohol.

16. An oxidatively-stable brominated elastomer composition comprising:

a copolymer made from a C_4 to C_7 isomonoolefin and at least one monomer or polymerizable unit selected from isoprene and alkylstyrene; and

an oxidized Mooney stabilizer additive comprising an oxidized nitroxy-functional hindered amine stabilizer (HAS) and an acidified quaternary ammonium,

wherein the brominated elastomer composition has an initial Mooney viscosity of no more than about 10 Mooney units lower than an aged Mooney viscosity after being subject to 80°C for 7 days.

17. The brominated elastomer composition of claim 16, further comprising 0.001 to 0.2 mol% of an allylic alcohol.