CLAIMS

WHAT IS CLAIMED IS

1. A process for preparing a sulfurized alkyl phenate product, the process comprising:

sulfurizing an alkyl phenol with a source of sulfur to provide a sulfurized alkyl phenol, wherein the alkyl phenol is derived from an alkylation of a phenol, neutralizing and optionally overbasing the sulfurized alkyl phenol in the presence of a solvent to provide a sulfurized alkyl phenate composition including a mixture of a sulfurized alkyl phenate and a residual unsulfurized alkyl phenol, wherein the sulfurizing, the neutralizing, and the optional overbasing may occur in any order; and

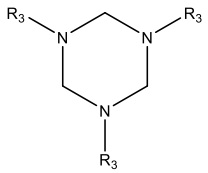
post processing the sulfurized alkyl phenate composition to obtain the sulfurized alkyl phenate product, wherein the post processing includes reacting the sulfurized alkyl phenate composition with a triazine compound.

2. The process for preparing a sulfurized alkyl phenate product of claim 1, wherein the source of sulfur includes elemental sulfur, sulfur monochloride, sulfur dichloride, hydrogen sulfide, sulfur dioxide, sulfide hydrates, or combinations thereof; and/or wherein a mol ratio of the sulfur source to the alkyl phenol is 0.1 to 3.5.

3. The process for preparing a sulfurized alkyl phenate product of claim 1, wherein the neutralizing and/or the optional overbasing includes contacting the sulfurized alkyl phenol with an alkali or alkaline earth metal salt.

4. The process for preparing a sulfurized alkyl phenate product of claim 3, wherein the alkali or alkaline earth metal salt is lithium hydroxide, potassium hydroxide, sodium hydroxide, magnesium hydroxide, calcium hydroxide, barium hydroxide, aluminum hydroxide, lithium oxide, magnesium oxide, calcium oxide, barium oxide, or combinations thereof.

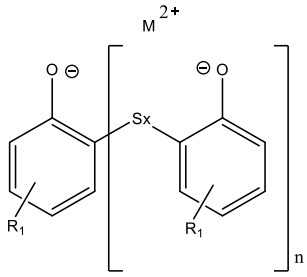
5. The process for preparing a sulfurized alkyl phenate product of claim 1, wherein the triazine compound has the structure of Formula III



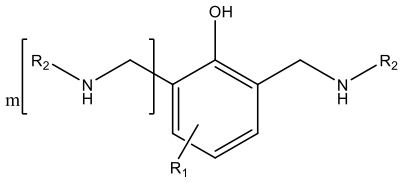
(Formula III)

wherein each R_3 is, independently, hydrogen, a hydrocarbyl group, an alkyl group, an amino group, a polyamino group, an alkylamino group, a dialklyaminoalkyl group, a C1 to C10 hydrocarbyl group or a $–R_4N(R_5)(R_5)$ group where each of R_4 and R_5 is, independently, a C1 to C10 hydrocarbyl group.

6. The process for preparing a sulfurized alkyl phenate product of claim 1, further comprising about 0.5 weight percent or less of an unsulfurized alkyl phenol; and/or wherein the sulfurized alkyl phenate product includes a compound of Formula I and a compound of Formula II:



(Formula I)



(Formula II)

wherein

each R_1, independently, is an alkyl group, an aryl group, an alkylaryl group, or arylalkyl group;

R_2 is an alkyl group, an aminoalkyl group, or a hydroxyalkyl group;

x is an integer from 1 to 4;

n is an integer from 1 to 3;

m is an integer of 0 or 1; and

M^{2+} is a divalent metal ion.

7. The process for preparing a sulfurized alkyl phenate product of claim 6, wherein R_1 is a C8 to C20 alkyl group; and/or wherein R_2 is methyl or has the structure $–R_4N(R_5)(R_5)$

wherein R_4 is a C1 to C10 hydrocarbyl group and each R_5 is, independently, a C1 to C4 alkyl group.

8. A sulfurized metal phenate detergent prepared by the process of claim 1.

9. A lubricating oil composition comprising the metal phenate detergent of claim 8 and one or more base oils of lubricating viscosity.