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COAL SPRAY COMPOSITION

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The present invention relates to coal spray oils and the like and to the treating of solid carbonaceous lump fuels to prevent the formation of dust and other degradation products.

Various oils and other materials have been applied in the past to solid carbonaceous lump fuels, particularly coal, lignite, etc., for the purpose of laying dust, and more particularly for the purpose of preventing degradation known as alacking. This degradation is caused partly by the escape of moisture from the coal and partly by the oxidation of mineral material, particularly iron sulfide, contained in the cleavage veins of coal and similar fuels. Another important problem is that of dusting caused by mechanical abrasion. All of these phenomena are highly undesirable from the standpoint of the ultimate user and result as well in the loss of valuable fuel.

It is an object of the present invention to provide new and improved coal spray compositions which will prevent these degradation phenomena to a greater degree than has heretofore been the case. Another object of my invention is to provide coal spray materials which will prevent degradation and at the same time give a fuel which is free from undesirable staining characteristics. A further object of my invention is to provide coal spray compositions which will accomplish a given degree of dust-proofing with a smaller amount of material than has heretofore been necessary. A still further object of my invention is to provide coal spray materials which will form uniform films on lump fuels, even when not initially applied to the entire surface of such fuels. It is also an object of my invention to provide coal spray methods having the advantages enumerated. Other and more detailed objects, advantages and uses of my invention will become apparent as the description thereof proceeds.

The use of solvent extracts and compositions containing solvent extracts as coal spray oil constituents have been found to be advantageous for the prevention of degradation. Such extracts may be obtained from petroleum oils by the use of selective solvents such as Chlorex (beta beta' dichlorethyl ether), phenol, cresol, furfural, nitrobenzene, chloraniline, chlorphenol, sulfur dioxide, mixtures of two or more of these solvents, or other solvent mixtures such as benzol-acetone, benzol-methyl ethyl ketone, phenol containing a small amount of water, etc. The extracts contain aromatic and/or poly-nuclear naphthenic stocks, while the raffinate contains mono-nuclear naphthenic stocks and/or "relatively paraffinic" materials.

I have found that solvent extracts have a far greater value in coal spray compositions when the extracts or compositions containing same are oxidized. Such treatment of extracts not only prevents degradation phenomena to a greater extent than heretofore possible, but also improves the odor and color characteristics of the treated lump fuels. The oxidation of the extracts may be carried out in any one of several well-known ways as, for instance, by those methods used in the production of asphalt, although the oxidized extract possesses properties dissimilar to those of oxidized asphalt.

The nature and appearance of solvent extracts vary somewhat with the nature of the crude oil extracted, its preliminary treatment, the viscosity of the fraction treated, the nature of the solvent and the extent of the solvent treat, i. e., the solvent-oil ratio, extraction temperature, etc. For this reason the oxidation of solvent extracts for use in coal spray compositions shows greater improvement in some cases than in others, but in all cases a marked improvement is apparent. Particularly good sprays are obtained by oxidizing solvent extracts obtained in the manufacture of relatively light lubricating oils such as S. A. E. 20 oils.

As stated before, the oxidation of the solvent extracts also greatly improves the odor and color thereof. For instance, certain solvent extracts such as those obtained from Illinois crude, are not directly suitable for coal spray compositions because of their brown color. Oxidation of these particular extracts changes the color to black and results in a more salable product.

Many solvent extracts and indeed most of them, have very disagreeable odors which persist even after the spray composition has been used. Such odors must be eliminated because purchasers demand relatively odorless products. Previously this was one of the most difficult requirements to meet. According to my invention, the oxidation of the solvent extracts substantially eliminates all odors easily and quickly.

Although it is possible to prepare a satisfactory coal spray oil by oxidizing a blend of diluent oil and solvent extract, it is preferred to oxidize the solvent extract separately and then blend the same with the diluent oil.

The oxidation can be carried out in any desired manner but it has been found that particularly good results are obtained when air is blown through the extract at an elevated temperature for at least one-half hour. The temperature may vary from about 300° F. to about 500° or 550° F.

It is, of course, desirable to oxidize at fairly high temperatures since the rate of oxidation doubles with approximately every 20 to 30 degrees increase in temperature.

As a specific example, an S. A. E. 20 Chlorex extract was oxidized for two and one-half hours at 375° F. At the end of the first hour of oxidation it was noted that the characteristic and disagreeable odor of the extract was absent. As the oxidation proceeded the extract became darker and its viscosity increased. At the end of the two and one-half hour period the extract was dark enough, so that when blended with a diluent oil the resulting blend had a satisfactory color for coal spray purposes. It was also found desirable, when cooling the oxidized extract, to continue to blow the extract with a small amount of air in order to remove any residual oxidation products which might be present.

The particular extract used, prior to oxidation, had a viscosity at 100° F. of 3098 seconds Saybolt Universal and after oxidation the viscosity had been increased to 4612 seconds Saybolt Universal. Since high viscosity coal spray compositions are often desirable, this constitutes another marked advantage of my invention.

The coal spray compositions can contain from 20% to 100% of the oxidized solvent extract and from 0 to 80% of a blending oil. Preferably, however, they contain from about 30% to about 85% of the oxidized extract, the remainder being blending oil. While a variety of blending oils may be used, it is preferable to employ a petroleum product having a viscosity of from about 50 to about 150 seconds Saybolt Universal at 100° F., although more viscous blending oils can be used when a more viscous product is desired. When a particularly viscous product is desired, for instance when high temperature spraying equipment is available, the coal spray composition may consist entirely of oxidized solvent extract.

The following blends have been found to be satisfactory in practice:

	I	II
Diluent oil, viscosity of 100–105 sec. S. U. at 100° F., percent volume	55	39
S. A. E. 20 extract oxidized for 2½ hours, percent volume	45	61
Viscosity at 100° F. of blend (seconds S. U.)	347	626

Coal spray compositions according to the present invention may contain, if desired, other ingredients in small amounts such as, for instance, asphalt and the like.

It is clear that various modifications will be apparent to one skilled in the art without departing from the spirit of the invention. While the present invention has been described in connection with certain specific embodiments, it is to be understood these are by way of illustration and not by way of limitation, and I do not mean to be bound thereby but only to the scope of the appended claims.

I claim:

1. A coal spray oil composition comprising an oxygen-treated solvent extract prepared by treating an uncracked petroleum lubricating oil stock with a selective solvent to produce a substantially non-paraffinic extract and treating said extract with oxygen at temperatures within the approximate range of 300° F. to 550° F. for a time sufficient to effect a substantial increase in viscosity.

2. A coal spray oil composition as claimed in claim 1 wherein the substantially non-paraffinic extract is treated with oxygen by blowing with air for at least about one-half hour.

3. A coal spray oil composition as claimed in claim 1 wherein the substantially non-paraffinic extract comprises an S. A. E. 20 extract, said extract being oxidized for about two and one-half hours at about 375° F.

4. A coal spray oil composition comprising an oxygen-treated solvent extract prepared by treating an uncracked petroleum lubricating oil stock with a selective solvent to produce a substantially non-paraffinic extract and treating said extract with oxygen at temperatures within the approximate range of 300° F. to 550° F. for a time sufficient to effect a substantial increase in viscosity and a blending oil having a solvent power for said oxygen-treated solvent extract and having a viscosity from about 50 to about 150 seconds Saybolt Universal at 100° F.

5. A coal spray oil composition as claimed in claim 4 comprising from about 20% to 100% of the oxygen-treated solvent extract and the remainder of said composition, if any, being the blending oil.

6. A coal spray oil composition as claimed in claim 4 comprising from about 30% to about 85% of the oxygen-treated solvent extract and from about 70% to about 15% of the blending oil.

7. A coal spray oil composition as claimed in claim 4 comprising from about 45% to about 60% of the oxygen-treated solvent extract and from about 55% to about 40% of the blending oil.

8. A method of dust-proofing a solid carbonaceous lump fuel which comprises applying thereto a composition containing a substantial amount of an oxygen-treated solvent extract prepared by treating an uncracked petroleum lubricating oil stock with a selective solvent to produce a substantially non-paraffinic extract and treating said extract with oxygen at temperatures within the approximate range of 300° F. to 550° F. for a time sufficient to effect a substantial increase in viscosity.

9. A method of dust-proofing a solid carbonaceous lump fuel as claimed in claim 8 wherein the composition contains from about 30% to about 85% of the oxygen-treated solvent extract.

10. A method of dust-proofing a solid carbonaceous lump fuel as claimed in claim 8 wherein the composition contains from about 30% to about 85% of the oxygen-treated solvent extract and a blending oil having a solvent power for said oxygen-treated solvent extract and having a viscosity of from about 50 to about 150 seconds Saybolt Universal viscosity at 100° F.

11. A method of dust-proofing a solid carbonaceous lump fuel as claimed in claim 8 wherein the composition contains from about 45% to about 60% of the oxygen-treated solvent extract and from about 55% to about 40% of a blending oil having a solvent power for said oxygen-treated solvent extract and having a viscosity of from about 50 to about 150 seconds Saybolt Universal viscosity at 100° F.

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