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ROAD MARKER MATERIALS AND METHODS OF MAKING SAME

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This invention relates to new and useful improvements in road-marker materials and methods of making same.

An object of this invention is to provide a new and improved road-marker material and method of making same wherein the marker material is more economical and has an increased life as compared to paint and other materials which are presently being used for road-marker materials.

An important object of this invention is to provide a new and improved road-marker material which includes plasticized sulfur to which has been added a quantity of wood rosin in sufficient amount to improve the bond of the material to the road and also to reduce the fracturing and breaking off of the material from the road by reason of traffic wear as compared to a road-marking material which does not have the wood rosin present therein.

Another object of this invention is to provide a new and improved road-marker material which is adapted to be laid on the road for bonding thereto and by spreading, spraying or any other suitable procedure, the material being capable of being laid in a sufficiently thick layer that the driver of an automobile or other vehicle can tell when the wheels of the vehicle are on such material, whereby said marker-material serves not only as a light-reflective surface but also as a physical indicator.

Another object of this invention is to provide a new and improved method of making a road-marker material wherein sulfur is first melted and mixed with a plasticizer and thereafter a quantity of wood rosin is added to the mixture to form a marker material which is light-reflective and which is adapted to bond to road surfaces such as concrete and asphalt.

The new road-marker material of this invention is basically plasticized sulfur material to which wood rosin has been added to improve the qualities of the material. The sulfur is preferably plasticized by mixture with "Thiokol-Type A," which is the trade name for a polymer, polyethylene tetrasulfide, which is believed to have the chemical formula $(C_2H_4S_4)_x$ or $(C_4H_8S_4)_x$. Although the proportions of the foregoing-named major components of the marker material of this invention can be varied within relatively wide limits while still obtaining the advantages of this invention, the following percentages by weight of these major components indicate the relative proportions preferred for the material:

	Percent
Sulfur	60–98
"Thiokol-Type A"	1–25
Wood rosin	1–15

As will be explained in detail hereinafter, the above-listed basic components of the road-marker material of this invention are combined or mixed together in a particular manner so that the resulting product is capable of bonding or adhering tenaciously to road surfaces formed of concrete or asphalt or other similar materials. The road-marker material of this invention is also resistant to fracturing under traffic wear by automobiles and other vehicles and thus the material has an increased life as compared to paint and other known marker materials presently used. Additionally, the material of this invention is more economical and due to its increased life, less expense is required in laying and removing old material

for new or repaired laying of the marking material. The marker material of this invention is capable of being laid by spreading, spraying, brushing or any other known method of laying liquid materials. The material can be laid in layers which are sufficiently thick to indicate to a driver of an automobile or other vehicle when the wheels thereof are on such material. The material, therefore, serves as a physical indicator which is particularly valuable when the material is laid as the center stripe on a highway, since such stripe thereby warns a driver when he is on the wrong side of the highway.

By the addition of coloring pigments to the above-described major components of the marker material of this invention, the marker material can be changed from its normal yellowish sulfur color. For example, if the material is desired in a brilliant yellow color, a yellow pigment identified by the trade-name "Hansa Yellow," which is the coupling product between diazotized p-nitroaniline and acetoacetanilide, or the pigment sold under the trade-name "Toluidine Yellow YT–445–D" which is the coupling product between diazotized m-nitro-p-poluidine and acetoacetanilide. In the usual case, 1–3% by weight of the yellow pigment is utilized, with the basic components of the marker material referred to above being in the same relative proportions as above set forth. If it is desired to obtain a different color from yellow, for example the color white, suitable known pigments can be added to the major components of the marker material of this invention so that a brilliant white or other color is obtained. Of course, greater quantities of the white pigment are required to mask the yellowish color of the sulfur in the marker material than is required when using the yellow pigment. For improving the light-reflective properties of the product of this invention, glass beads or other light-reflective granular material of known properties can be included in the procedure for making the material so that the upper surface of the road-marker material when applied to the pavement or surface of the road contains a plurality of the finally-dispersed glass particles which, as is well known, serve to reflect light from almost any direction.

The method of making the traffic-marker material of this invention basically includes the first step of melting the desired quantity of sulfur, while preferably maintaining the temperature thereof below 160° C., because above such temperature, the viscosity of sulfur increases abnormally. The "Thiokol-Type A" is then added to the molten sulfur with stirring to mix the sulfur therewith. With the sulfur and the "Thiokol-Type A" in the molten condition, the wood rosin is added to the mixture, the heat of the molten material serving to rapidly melt the wood rosin and upon stirring to disperse the wood rosin with the other previously added materials. The material is then in a condition for being spread or otherwise laid on the pavement to serve as a road marker.

If any additives are to be incorporated in the basic road-marker material of this invention, such additives would be mixed with the molten sulfur and "Thiokol-Type A" prior to the addition of the wood rosin. For example, if it is desired to make the material of this invention light-reflective so as to reflect light such as from vehicle headlights, glass beads or other granular materials such as powdered silica and Ottawa sand would be added during the manufacture of the material, such addition preferably being made just after the addition of the "Thiokol-Type A." Also, it may be desirable to include a bactericide such as "Santophen 1" which is o-benzyl-p-chlorophenol or "Dowicide 7" which is pentachlorophenol. These would be added prior to the addition of the wood rosin in the above-described procedure. The pigment is ordinarily best mixed with the sulfur in a relatively dry state

prior to the melting of the sulfur in the above-described method.

In laboratory procedure, the following specific method was performed for obtaining the marker material of this invention. The sulfur was initially crushed to relatively small particles so as to pass a #10 sieve. The sulfur was initially mixed thoroughly with the pigment (yellow pigment) on a flat surface and the mixture was transferred to a container and thereafter the container with the sulfur and pigment were heated to a temperature slightly under 160° C. to melt the sulfur and thereby mix the pigment with the sulfur. The plasticizer, "Thiokol-Type A," was added to the molten sulfur and the heating of the container at a temperature slightly below 160° C. was continued while the "Thiokol-Type A" and the sulfur were thoroughly stirred to give a viscous mixture, which became more mobile after continued stirring and heating. In various tests, the quantities of sulfur varied from 600–1200 grams and the quantities of "Thiokol-Type A" varied from 50–300 grams. Then, about 2% by weight of wood rosin was added to the molten mixture of the sulfur and the "Thiokol-Type A" and the heating at a temperature below 160° C. was continued with the mixture being stirred to distribute the wood rosin. Prior to the time that a discoloration of the material occurred by an overheating of the rosin, such material was removed from the source of heat.

While the material is still hot, it is laid on the road or other pavement to serve as a marker. The material can be laid by spreading, spraying, brushing or by any other suitable procedure. The material made by the above process, including other specific examples wherein proportions of various additives of the types previously referred to, have been treated from the standpoint of their adherence to pavement such as concrete and asphalt to add to their life under traffic from automobiles and other vehicles. The results of such tests showed that the addition of the relatively small percentages of the rosin indicated above produced a product which was surprisingly far superior to previously known traffic-marker materials.

Although the material of this invention has been described above for use as a road-marker material, it is believed evident that the material has numerous other uses, for example as a marker on airport-landing strips and the like, and of course the material of this invention is not limited to the specific uses above enumerated.

What is claimed is:

1. A new composition of matter adapted to be used as a road marker material comprising sulphur, polyethylene tetrasulphide and wood rosin as component materials, between 60% and 98% by weight of said component materials of said sulphur and between 1% and 25% by weight of said component materials of said polyethylene tetrasulphide mixed while maintaining the mixture at a temperature below 160° C. which will maintain the mixture in the molten state to plasticize the sulphur, said mixture of sulphur and polyethylene tetrasulphide being thereafter admixed with between 1% and 15% by weight of said component materials of said wood rosin while maintaining the mixture in the molten state at a temperature below 160° C. for a sufficient time to distribute the wood rosin with the rest of the components of the material but less than the period of time which will cause substantial discoloration of the material from prolonged heating.

2. The method of forming plasticized sulphur road marker material having sulphur, polyethylene tetrasulphide and wood rosin as component materials comprising the steps of, mixing approximately 60% to 98% by weight of the component materials of sulphur and between approximately 1% and 25% of the component materials of polyethylene tetrasulphide while maintaining the mixture at a temperature below 160° C. which will maintain the mixture in the molten state to plasticize the sulphur, and thereafter admixing between approximately 1% and 15% by weight of the component materials of wood rosin with the mixture while maintaining the mixture in the molten state at a temperature below 160° C. for a sufficient time to distribute the wood rosin with the rest of the components of the material but less than the period of time which will cause substantial discoloration of the material from prolonged heating.

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