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TREATMENT OF PETROLEUM BITUMINOUS MATERIALS

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The present invention relates to a method for increasing the melting point of bituminous materials, and particularly bituminous materials such as cracked or uncracked petroleum residues.

A principal object of this invention is the treatment of petroleum residues for the production of asphalts having higher melting points than the residues employed as starting materials.

A further object of this invention is the treatment of residual oils or asphalts produced by the cracking or non-cracking distillation of petroleum, residues from the hydrogenation of petroleum, residual oils produced by polymerization, and asphaltic residues produced by the treatment of asphaltic petroleum oils with asphalt-precipitating agents.

In the production of asphalts of increased melting point, it has heretofore been customary to subject the asphaltic residual oils to fire and steam distillation for the removal of oil, or to subject the residual oils to oxidation by air, in the presence or absence of oxidation catalysts. In either case it is necessary to use large quantities of fuel and/or steam in order to produce asphaltic materials of the desired melting point, and, in many instances it is practically impossible to produce the desired melting point without affecting the other properties of the asphalt to an undesirable extent.

I have found that the melting point of petroleum residua, and particularly petroleum asphalts, may be increased in a relatively simple and inexpensive manner. In accordance with my invention, petroleum residual oil or asphalt is heated in the presence of an alkaline agent, such as sodium hydroxide, to a temperature within the range of from about 450° F. to 750° F. for a period of from about 15 minutes to about 6 to 8 hours. Such treatment effects a substantial increase in the melting point of the asphaltic material, and such increase may be of the order of from about 15° F. to about 150° F., depending upon the temperature and duration of the treatment.

In carrying out my process, it is preferable to employ an alkaline agent in substantially solid or anhydrous condition. The treatment consists essentially in adding to the asphaltic material, which may be heated to a molten or fluid condition, a quantity of an alkali metal hydroxide, such as caustic soda, varying from about 0.5% to about 10% by weight of the asphaltic material, and heating the admixture to a temperature preferably of the order of about 600° F. to 700° F. The admixture may be continuously or periodically

agitated during the heating step by any suitable means, such as a mechanical stirrer, or by blowing with air or an inert gas. The treatment, when carried on at the lower temperatures, i. e., of the order of 450° F. to 500° F., generally requires a longer period of heating than when such treatment is effected at higher temperatures, for example, of the order of 600° F. to 750° F. The heating of the asphaltic material and alkaline agent may be carried on in a batch apparatus, but is preferably effected in a continuous system wherein the asphaltic material and alkali are continuously charged to the system, and the product of the fusion is continuously withdrawn therefrom.

My invention may be further illustrated by the following examples, wherein various asphaltic materials were subjected to fusion with about 5% by weight of dry sodium hydroxide at a temperature of about 650° F. for 15 minutes.

Charge	Melting point		Melting point increase
	Initial	Final	
	° F.	° F.	° F.
Cracking still tar (Cross tar).....	112	140	28
Cracking still tar (de Florez tar).....	118	188	70
Crude oil bottoms (Winkler crude).....	117	204	87
Crude oil residuum (Mexican crude).....	138	277	139
Do.....	214	320+	106+
Crude oil residuum (Barber's Hill crude).....	191	320+	129+

It will be seen from the above examples that my fusion process is applicable to a variety of petroleum asphaltic materials, and affords a simple and economical method for increasing the melting point of such asphaltic materials. My process may be applied not only to petroleum residual oils, tars or asphalts produced by the cracking or non-cracking distillation of petroleum, but also to residual asphaltic materials from the destructive hydrogenation of petroleum, and asphaltic materials separated from petroleum by means of agents such as naphtha, liquefied normally gaseous hydrocarbons, i. e., butane, propane, ethane and the like, or other precipitating agents.

What I claim is:

1. The method of increasing the melting point of petroleum bituminous material which comprises admixing said bituminous material with sodium hydroxide and heating the admixture to a temperature within the range of from about 600° F. to about 700° F.

2. The method of increasing the melting point

of petroleum bituminous material which comprises admixing said bituminous material with about 0.5% to about 10% of sodium hydroxide and heating the admixture to a temperature within the range of from about 600° F. to about 700° F.

3. In the method of increasing the melting point of petroleum bituminous material, the step which comprises heating said bituminous material in the presence of an alkali metal hydroxide,

to a temperature within the range of from about 450° F. to about 750° F. for a period of from about 15 minutes to about 8 hours.

4. In the method of increasing the melting point of petroleum asphalt, the step which comprises heating said asphalt, in the presence of sodium hydroxide, to a temperature within the range of from about 600° F. to about 700° F. for a period of about 15 minutes.

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