ANTIFOAM ACTIVITY OF DIFFERENT VISCOSITY SILICONES AS A FUNCTION OF TIME

FIG. I

12,500 cstk. Silicone • Silicone dose of .4 ppm
60,000 cstk. Silicone x Silicone dilution of 1 to 150
150,000 cstk. Silicone △

FIG. I A

Inventor
James A. Hyde

By: John D. Orem
Attorney
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AS A FUNCTION OF TIME

FIG. II
150,000 CSTK. SILICONE △ SILICONE DOSE OF 24 PPM
400,000 CSTK. SILICONE ○ SILICONE DILUTION OF
1 TO 250

FOAM HEIGHT IN INCHES

0 10 20 30 40 50 60 70 80
TIME IN SECONDS - FIRST DOSE OF SILICONE

FIG. II A

FOAM HEIGHT IN INCHES

0 10 20 30 40 50 60 70 80
TIME IN SECONDS
SECOND DOSE OF SILICONE

Inventor
James A. Hyde

By John S. Bremo
Attorney
SILICONE OIL ANTIFOAM

ANTIFOAM ACTIVITY OF DIFFERENT VISCOSITY SILICONES AS A FUNCTION OF TIME

FIG. III

- 400,000 cstk. Silicone ○ Silicone dose of 17 ppm
- 1,000,000 cstk. Silicone □ Silicone dose of 1 to 15 ppm
- 3,800,000 cstk. Silicone ▲ Silicone dose of 0.1 ppm

FOAM HEIGHT IN INCHES

TIME IN SECONDS - FIRST DOSE OF SILICON

FIG. III A

- 400,000 cstk. Silicone ○ Silicone dose of 17 ppm
- 1,000,000 cstk. Silicone □ Silicone dose of 1 to 15 ppm
- 3,800,000 cstk. Silicone ▲ Silicone dose of 0.1 ppm

FOAM HEIGHT IN INCHES

TIME IN SECONDS - SECOND DOSE OF SILICON

Inventor
James A. Hyde

By John G. Prene
Attorney
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3,700,587
SILICONE OIL ANTIFOAM
James A. Hyde, Downers Grove, Ill., assignor to Nalco Chemical Company, Chicago, Ill.
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ABSTRACT OF THE DISCLOSURE

The foaming occasioned by the conversion of residual petroleum stocks into coke by delayed coking processes is controlled by treating such stocks with a polydimethyl siloxane which has a centistoke viscosity of at least 150,000.

In the processing of various residual petroleum stocks into coke, a commonly used technique is the well-known delayed coking process. In the delayed coking process heavy residual oils are heated to above 500° F., by pumping them at high velocity through a pipe furnace and then charging these oils to an insulated coking drum. This process is further described in the Encyclopedia of Chemical Technology, 2nd edition, volume IV.

The delayed coking process produces quantities of foam which is undesirable since it diminishes the efficient operation of the process. To control foam in the delayed coking process it is customary to treat the stocks while being processed with polydimethyl siloxane polymers.

The polydimethyl siloxane polymers most commonly used as defoamers in this application are of relatively low molecular weight as evidence by their centistoke viscosities. Typical polydimethyl siloxanes have centistoke viscosities of about 12,500. In a few cases polydimethyl siloxanes have been used which have centistoke viscosities of about 60,000.

The present invention is directed to provide improved defoaming methods for the treatment of petroleum stocks which are subjected to delayed coking processes.

In accordance with the invention it has been found that the foaming of residual petroleum stocks subjected to delayed coking processes may be inhibited by treating said stocks with from 0.05 up to about 100 p.p.m. of a polydimethyl siloxane which has a centistoke viscosity of at least 150,000. In a preferred embodiment of the invention it is preferred to use polydimethylsiloxanes which have centistoke viscosities ranging between 400,000 to 3,000,000, which are applied in a preferred dosage range of from 0.1 to 10 p.p.m.

To use these viscous polydimethyl siloxanes it is desirable that they be first dispersed in petroleum hydrocarbon solvents such as kerosenes, naphthas, aromatic oils, and the like. In some cases it is desirable to blend oil soluble surfactants with the polydimethyl siloxanes and the petroleum hydrocarbon liquid.

To illustrate the advantages and merits of the invention reference may be had to the drawings, e.g. FIGS. I, II and III, which show the relative merits of the polydimethyl siloxanes used in this invention over other lower molecular weight materials.

The data shown in the FIGS. I, II and III were based upon the following test procedure:

TEST PROCEDURE

(1) A test tube is charged with 90 grams of coker feedstock. This sample is heated to 850° F. and maintained at that temperature for the evaluation in order to simulate the conditions of a coking drum.

(2) For the evaluation, different viscosity silicones were diluted with decolorized kerosene. This evaluation was made on a straight weight basis.

(3) The diluted silicone is added once drop at a time.

(4) The foam height is recorded before and immediately after the silicone is added and every 10 seconds thereafter.

(5) When the foam height has reached 1/2 inch below the initial height, the next drop of antifoam is added. This procedure is continued until 3 drops have been added.

I claim:

1. A method of inhibiting foaming of residual petroleum stocks during their conversion into coke by a delayed coking process which comprises treating said residual petroleum stocks with from 0.05 up to about 100 p.p.m. of a polydimethyl siloxane which has a centistoke viscosity of at least 150,000.

2. The method of claim 1 where the polydimethyl siloxane has a centistoke viscosity of from 400,000 to 3,000,000 and it is used as a dosage ranging from 0.1 to 10 p.p.m.

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JAMES E. POER, Primary Examiner
A. P. DEMERS, Assistant Examiner
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