WO 2018/104071 A1 discloses an aqueous dispersion comprising a continuous aqueous phase comprising water and an organic solvent miscible with water having a melting point of less than - 20 °C, and particles of a paraffin inhibitor component which are dispersed in the aqueous phase. The paraffin inhibitor component comprises an organic solvent which is not miscible with water and a polymeric, oil-soluble paraffin inhibitor comprising olefines and carboxylate groups comprising monomers which are at least partially esterified with alcohols. The dispersion is stabilized by at least 3 different non-ionic surfactants in an amount of 12 % to 35 % by weight relating to the paraffin inhibitor component. The examples specifically teach amounts of 13.3 % to 15.4 % by weight of surfactants relating to the paraffin inhibitor component.

The aqueous dispersions in WO 2018/104071 A1 have a good low-temperature stability, however the amounts of surfactants are high. Also, in other publications cited, the amounts of surfactants -relating to the organic phase, i.e. the paraffin inhibitor component- are high.

Surprisingly, it has been found that aqueous dispersions of paraffin inhibitors having a good low-temperature stability can be obtained by using certain anionic surfactants in relatively low amounts.

In an aspect, there is provided an aqueous dispersion comprising at least

(A) a continuous aqueous phase comprising water and a water-miscible organic solvent,

(B) a dispersed phase comprising at least one paraffin inhibitor component having a melting point of not more than 100°C, wherein the amount of the paraffin inhibitor component is from 10 % to 60 % by weight relating to the total of all components of the aqueous dispersion, and the paraffin inhibitor component comprises at least

- 30 % to 100 % by weight -relating to the total of the paraffin inhibitor component- of at least one polymeric, oil-soluble paraffin inhibitor (X),
- 0 % to 70 % by weight -relating to the total of the paraffin inhibitor component- of a hydrocarbon or a hydrocarbon mixture having a boiling point of at least 100 °C, and

(C) at least one surfactant (S),

wherein

- the surfactant (S) is anionic and comprises at least one anionic group selected from sulfonate, sulfate, phosphonate or phosphate groups,

- the amount of the surfactants (S) is from 1 % to 7 % by weight relating to the paraffin inhibitor component, and
- the D_{50} particle size (volume size distribution) of the dispersed phase, measured by dynamic light scattering is from 50 nm to 500 nm.

In a second example of the present disclosure, methods of manufacturing such aqueous dispersions have been found.

In another aspect, there is provided a process for producing an aqueous dispersion as defined above, which comprises

(a1) Providing an oil-in-water emulsion by mixing the paraffin inhibitor component at a temperature above its melting point with at least water and the surfactant(s) (S) and distributing it in the aqueous phase,

(a2) homogenizing the oil-in-water emulsion by means selected from the group of a homogenizer, ultrasound treatment, or a rotor-stator disperser, and

(a3) adding a water-miscible organic solvent, wherein the addition may be carried out at any stage of the process.

In another aspect, there is provided a process for producing an aqueous dispersion as defined above, which comprises

(b1) providing an oil-in-water emulsion by mixing oil-soluble, monoethylenically unsaturated monomers for forming a polymeric, oil-soluble paraffin inhibitor (X) with the surfactant(s) (S) and at least a portion of the aqueous phase, and

(b2) homogenizing the oil-in-water emulsion by means of a homogenizer, ultrasound treatment, or a rotor-stator disperser, and

adding initiators for radical polymerization to the homogenized oil-in-water emulsion and polymerizing, thereby obtaining a paraffin inhibitor component which is a dispersed phase in a continuous aqueous phase.

In a third example, the use of the aqueous dispersions as pour point depressant for crude oil and for prevention of wax deposits on surfaces has been found.

In another aspect, there is provided a use of aqueous as defined above as pour point depressants for crude oil, by adding at least the aqueous dispersion as defined above to the crude oil.

In another aspect, there is provided a use of aqueous dispersions as defined above for prevention of wax deposits on surfaces that are in contact with crude oil, by adding at least one aqueous composition as defined above to the crude oil.

In a forth example, the use of the aqueous dispersions for reducing the crystallization of paraffin crystals in fuels, for improving the cold flow properties of fuel oils and/or for improving the filterability of fuel oils has been found.

In another aspect, there is provided a use of the aqueous dispersions as defined above for reducing the crystallization of paraffin crystals in fuels or fuel oils by adding at least the aqueous dispersion as defined above to the fuels.

In another aspect, there is provided a use of the aqueous dispersions as defined above for reducing the yield stress of crude oil.

In another aspect, there is provided a use of the aqueous dispersions as defined above for improving the cold flow properties of fuel or fuel oils and/or for improving the filterability of fuel or fuel oils.

In a fifth example, a fuel oil compring the aqueous dispersion has been found.

In another aspect, there is provided a fuel or fuel oil comprising at least one aqueous dispersion as defined above, wherein the aqueous dispersion is used in such an amount that the concentration of the paraffin inhibitors (X) is from 10 ppm to 3,000 ppm by weight based on the fuel oil.

With regard to the invention, the following can be stated specifically:

In the aqueous dispersion according to the invention, a dispersed phase comprising at least a paraffin inhibitor component is distributed in a continuous aqueous phase at least comprising water and a water-miscible organic solvent, wherein the dispersion is stabilized by at least one anionic surfactant.

<u>Aqueous phase</u>

The continuous aqueous phase comprises water and at least one water-miscible organic solvent.

Examples of water-miscible organic solvents especially include alcohols such as methanol, ethanol, n-propanol, i-propanol, ethylene glycol, diethylene glycol, 1,2-propylene glycol, 1,3-propylene glycol, ethylene glycol monomethyl ether, propylene glycol monomethyl ether, dipropylene glycol monomethyl ether, butylene glycol and ethylene glycol monobutyl ether.

In one embodiment of the invention, examples of water-miscible organic solvents include methanol, ethanol, n-propanol, i-propanol, ethylene glycol, diethylene glycol, 1,2-propylene glycol, 1,3-propylene glycol, ethylene glycol monomethyl ether and propylene glycol monomethyl ether.