SUMMARY ~~OF INVENTION~~

The present ~~invention~~disclosure discloses a composition comprising: an AA-AMPS copolymer and PMA. In an aspect, there is provided a composition comprising: an acrylic acid/2-acrylamido-2-methyl propyl sulfonic acid (AA-AMPS) copolymer and polymaleic acid (PMA), optionally wherein said composition excludes one or more phosphorous compounds, wherein said AA-AMPS copolymer is 5 to 40 weight percent based upon actives and PMA is 5 to 40 weight percent based upon actives.

~~The~~In another aspect, the present ~~invention~~disclosure also discloses a method of inhibiting scale formation and deposition from a feed stream passing through a membrane system which comprises the steps of: (a) optionally controlling the pH of said feed stream within the range between about 7.0 and about 10; (b) optionally controlling the temperature of said feed stream within the range between about 5°C to about 40°C when the membrane system is a membrane system that contains at least one reverse osmosis membrane (an RO system), a nanofiltration (NF) system, an electrodialysis or electrodialysis reversal (ED) system, an electrodeionization (EDI) system or a combination thereof; (c) optionally controlling the temperature of said feed stream within the range between about 40°C and about 80°C when the membrane system is a~~n~~ membrane distillation (MD) system ; and (d) adding an effective amount of a~~the~~ composition ~~comprising: anAA -AMPS copolymer and PMA.~~as disclosed above to said feed stream.

a The present ~~invention~~disclosure further discloses a method of inhibiting calcium carbonate scale formation and deposition from a feed stream passing through a membrane system which comprises the steps of: (a) optionally controlling the pH of said feed stream within the range between about 7.0 and about 10; (b) optionally controlling the temperature of said feed stream within the range between about 5°C to about 40°C when the membrane system is an RO system, a NF system, an ED system, an EDI system or a combination thereof; (c) optionally controlling the temperature of said feed stream within the range between about 40^0C and about 80^0C when the membrane system is an MD system; and (d) adding an effective amount of a composition comprising: an AA-AMPS copolymer and PMA.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows solution turbidity (a) and percentage (%) inhibition (b) of $CaCO_3$ precipitate formation for relatively simple Type I water.

Figure 2 shows solution turbidity (a) and % inhibition (b) of $CaCO_3$ precipitate formation for relatively complex Type II water.

Figure 3 shows solution turbidity for control, Product D and phosphonate product E (for comparison) for Type III water which contains silica as well as 0.8ppm Fe^{3+}.

DETAILED DESCRIPTION OF THE INVENTION

Definitions: