Claims

1. A fouling control coating composition comprising an ingredient having biocidal properties for aquatic organisms and

   (a1) a polymer comprising quaternary ammonium groups and/or quaternary phosphonium groups bound to the backbone of the polymer, said quaternary ammonium groups and/or quaternary phosphonium groups being neutralised by a conjugate base of a sulphonic acid having an aliphatic, aromatic, or alkaryl hydrocarbyl group, and

   (a2) a polymer comprising silyl ester groups.

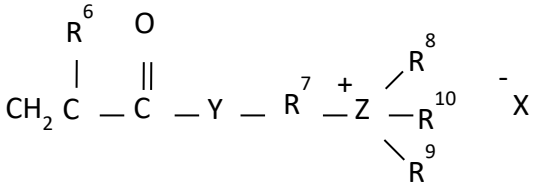
2. A fouling control coating composition according to claim 1 wherein the conjugate base of the sulphonic acid has an aliphatic, aromatic, or alkaryl hydrocarbyl group comprising 6 or more carbon atoms.

3. The fouling control coating composition of any preceding claim wherein the polymer comprising silyl ester groups (a2) has a weight-average molecular weight of less than 70,000.

4. The fouling control coating composition of any preceding claim, wherein the weight ratio of polymer(a1): polymer(a2) in the fouling control coating composition is from 1:20 to 20:1, preferably 1:4 to 4:1.

5. The fouling control coating composition of any preceding claim wherein the polymer (a1) and/or the polymer (a2) are (meth) acrylic polymers.

6. The fouling control coating composition of any preceding claim, wherein polymer (a1) is obtainable by polymerisation of a monomer of Formula (I), optionally with one or more other monomers comprising one or more olefinic double bonds



Formula (I):

wherein Y is O or NH,

Z^+ is N^+ or P^+,

R^6 is a hydrogen atom or a C_1-C_4 alkyl group, preferably hydrogen or a C_1-C_2 alkyl group,

R^7 is a C_2 or a C_3-C_{12} divalent hydrocarbon group, preferably a C_2 or a C_3-C_8 divalent hydrocarbon group, more preferably a C_2 or a C_3-C_4 divalent hydrocarbon group,

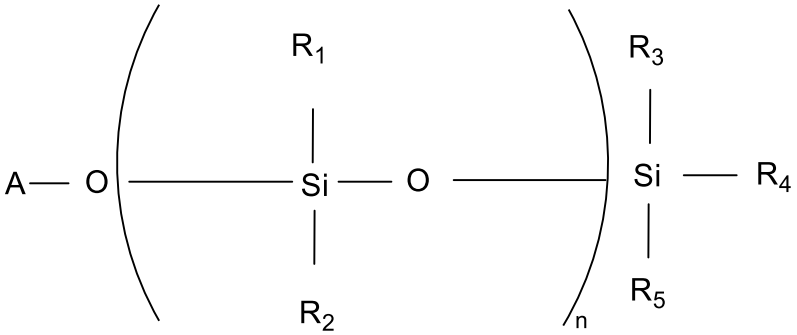
R^8 and R^9 independently represent a C_1-C_6 alkyl group, preferably methyl, or an optionally substituted phenyl group,

R^{10} is a C_1-C_5 alkyl group,

X^- is a conjugate base of a sulphonic acid comprising an aliphatic, aromatic, or alkaryl hydrocarbyl group.

7. The fouling control coating composition according to any preceding claim, characterised in that the counter-ions (X^-) of polymer (a1) is a conjugate base of a sulphonic acid comprising 6 to 50 carbon atoms.

8. The fouling coating composition according to any preceding claim, wherein the polymer comprising silyl ester groups (a2) comprises at least one side chain bearing at least one terminal group of the Formula (II):



Formula (II)

wherein A is divalent –C(O)- or –$S(O)_2O$- group, n is 0 or an integer of 1 to 50, and R_1, R_2, R_3, R_4, and R_5 are each independently selected from the group consisting of optionally substituted C_{1-20}-alkyl, optionally substituted C_{1-20}-alkoxy, optionally substituted C_{1-20} aryl, and optionally substituted C_{1-20} aryloxy.

9. The fouling control coating composition according to claim 8, wherein n = 0 and R_3, R_4, and R_5 are the same or different and represent methyl, isopropyl, n-butyl, isobutyl, or phenyl.

10. The fouling control coating composition according to any preceding claim, further comprising
(a) a rosin material and/or
(b) a non-hydrolysing, water-insoluble film-forming polymer (a3) .

11. The fouling control coating composition according to any preceding claim, wherein weight ratio of polymer (a1):polymer (a2) in the fouling control coating composition ranges from 1:4 to 4:1.

12. Method of protecting a man-made structure immersed in water from fouling by applying the fouling control coating composition as defined in any of claims 1-10 to the man-made structure, allowing the fouling control coating composition to form a coating and then immersing the coated man-made structure in water.

13. Substrate or structure coated with the fouling control coating composition according to any one of claims 1 to 11.