DESCRIPTION

Title of Invention:
ANTIFOULING PAINT COMPOSITION, COPOLYMER FOR ANTIFOULING PAINT COMPOSITION AND METHOD FOR MANUFACTURING SAME, AND PAINTED OBJECT HAVING ON SURFACE ANTIFOULING PAINT FILM FORMED USING SAID COMPOSITION

Technical Field

[0001]

The present invention relates to an antifouling coating composition, a copolymer for the antifouling coating composition and a method for producing the composition and/or the copolymer, and a coated object having, on its surface, an antifouling coating film formed using the composition.

Background Art

[0002]

Aquatic fouling organisms such as barnacles, tubeworms, common mussels, *Bugula neritina*, sea squirts, green laver, sea lettuce, and slimes attach to ships (especially ship bottoms), fishing tools such as fishing nets and fishing net accessories, and structures submerged in seawater such as power plant aqueducts, leading to dysfunction, impaired appearance, and other problems of the ships and so on.

Since a conventional organic tin-containing copolymer has been banned, triorganosilyl group-containing copolymers which have low toxicity and are environment-friendly have been developed and have been used for antifouling coating compositions (Patent Literature 1).

[0003]

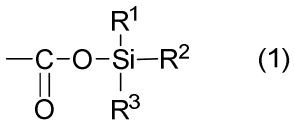
These copolymers can be typically produced by polymerization using a general-purpose polymerization initiator such as t-butylperoxy-2-ethyl hexanoate or AIBN, etc. The copolymers having an weight-average molecular weight (Mw) of 10,000 to 100,000 have been frequently used.

[0004]

The triorganosilyl ester copolymer produced by polymerization using the above general-purpose polymerization initiator may be used for an antifouling coating composition. In this case, an antifouling coating film formed using the antifouling coating composition dissolves in seawater at a constant rate during the initial stage. However, the dissolving rate of the coating film gradually increases. After a long period has passed, the dissolving rate of the coating film becomes too

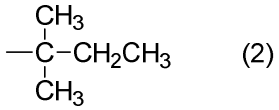
CLAIMS

1. A copolymer for an antifouling coating composition, comprising a copolymer (A) having, on a side chain, a group represented by chemical formula (1) and having, on terminal, at least one of a group represented by chemical formula (2) and a group represented by chemical formula (3), wherein
chemical formula (1) is



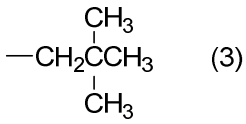
(1)

(wherein R^1, R^2, and R^3 are the same or different from each other and each represents a C_{3-6} alkyl group branched at an α-position or a phenyl group);
chemical formula (2) is



(2)

; and
chemical formula (3) is



(3)

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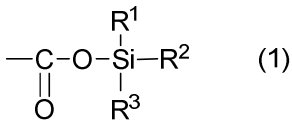
2. The copolymer for an antifouling coating composition according to Claim 1, wherein the copolymer (A) has, on terminal, both of the group represented by chemical formula (2) and the group represented by chemical formula (3).

3. The copolymer for an antifouling coating composition according to Claim 1 or 2, wherein the copolymer (A) is produced by polymerizing an ethylenically unsaturated monomer (a) having the group represented by chemical formula (1) and an ethylenically unsaturated monomer (b) copolymerizable with the monomer (a) under presence of a polymerization initiator 1,1,3,3-tetramethyl butylperoxy-2-ethyl hexanoate or 1,1,3,3-tetramethyl butylperoxy neodecanoate.

4. An antifouling coating composition comprising the copolymer therefor according to any one of Claims 1 to 3.

5. The antifouling coating composition according to Claim 4, further comprising a release modifier.

6. A method for producing a copolymer for an antifouling coating composition, comprising the steps of: polymerizing an ethylenically unsaturated monomer (a) having a group represented by chemical formula (1) and an ethylenically unsaturated monomer (b) copolymerizable with the monomer (a) under presence of a polymerization initiator 1,1,3,3-tetramethyl butylperoxy-2-ethyl hexanoate or 1,1,3,3-tetramethyl butylperoxy neodecanoate, wherein
chemical formula (1) is



(1)

(wherein R^1, R^2, and R^3 are the same or different from each other and each represents a C_{3-6} alkyl group branched at an α-position or a phenyl group).

7. A coated object having, on a surface thereof, an antifouling coating film formed using the antifouling coating composition according to Claim 4 or 5.

DESCRIPTION

Title of Invention:
ANTIFOULING COATING COMPOSITION, METHOD FOR PRODUCING COPOLYMER FOR ANTIFOULING COATING COMPOSITION, AND COATED OBJECT HAVING, ON SURFACE THEROF, ANTIFOULING COATING FILM FORMED USING THE COMPOSITION

Technical Field

[0001]

The present invention relates to an antifouling coating composition, a copolymer for the antifouling coating composition and a method for producing the composition and/or the copolymer, and a coated object having, on its surface, an antifouling coating film formed using the composition.

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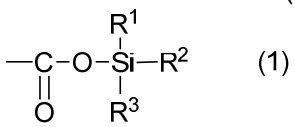
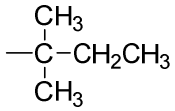
CLAIMS

1. An antifouling coating composition, comprising a copolymer (A) having, on a side chain, a group represented by chemical formula (1) and having, on terminal, at least one of a group represented by chemical formula (2) and a group represented by chemical formula (3), wherein
chemical formula (1) is



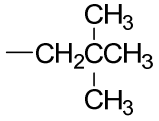
(1)

(wherein R^1, R^2, and R^3 are the same or different from each other and each represents a C_{3-6} alkyl group branched at an α-position or a phenyl group);
chemical formula (2) is



(2)

;
chemical formula (3) is



(3)

; and

the copolymer (A) is a copolymer produced by polymerizing an ethylenically unsaturated monomer (a) having the group represented by chemical formula (1) and an ethylenically unsaturated monomer (b) copolymerizable with the monomer (a).

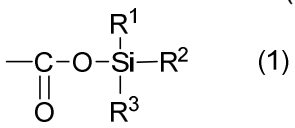
2. The antifouling coating composition according to Claim 1, wherein the copolymer (A) has, on terminal, both of the group represented by chemical formula (2) and the group represented by chemical formula (3).

3. The antifouling coating composition according to Claim 1 or 2, wherein the copolymer (A) is produced by polymerizing an ethylenically unsaturated monomer (a) having the group represented by chemical formula (1) and an ethylenically unsaturated monomer (b) copolymerizable with the monomer (a) under presence of a polymerization initiator 1,1,3,3-tetramethyl butylperoxy-2-ethyl hexanoate or 1,1,3,3-tetramethyl butylperoxy neodecanoate.

4. The antifouling coating composition according to any one of Claims 1 to 3, further comprising a release modifier.

5. A method for producing a copolymer for an antifouling coating composition, comprising the steps of: polymerizing an ethylenically unsaturated monomer (a) having a group represented by chemical formula (1) and an ethylenically unsaturated monomer (b) copolymerizable with the monomer (a) under presence of a polymerization initiator 1,1,3,3-tetramethyl butylperoxy-2-ethyl hexanoate or 1,1,3,3-tetramethyl butylperoxy neodecanoate, wherein

chemical formula (1) is



(1)

(wherein R^1, R^2, and R^3 are the same or different from each other and each represents a C_{3-6} alkyl group branched at an α-position or a phenyl group).

6. A coated object having, on a surface thereof, an antifouling coating film formed using the antifouling coating composition according to any one of Claims 1 to 4.