[TABLE 1]

	Silicone monomer		Non-silicone acrylamide		DMA (wt%)	%T	water content (%)	elastic modulus (psi)	Elong. (%)	stress zero time (sec)	DCA (degree)
	monomer	wt%	Monomer	wt%							
Working Example 1	(s1)	56.06	(h1)	1	31.27	92.0	40.7	95.2	254	0.81	36.5
Working Example 2	(s1)	56.06	(h1)	2	30.27	92.0	37.0	86.0	293	0.97	43.8
Working Example 3	(s1)	56.06	(h1)	3	29.27	91.7	38.0	107.9	306	0.99	45.2
Working Example 4	(s1)	56.06	(h1)	5	27.27	91.6	36.1	95.4	364	0.93	47.5
Working Example 5	(s1)	56.06	(h1)	7	25.27	91.5	37.3	116.9	370	0.85	50.1
Working Example 6	(s1)	56.06	(h1)	12	20.27	91.8	34.7	135.5	295	0.91	50.2
Working Example 7	(s1)	56.06	(h2)	1	31.27	91.2	40.0	103.0	232	1.01	35.2
Working Example 8	(s1)	56.06	(h2)	2	30.27	91.1	37.7	97.9	276	1.01	35.9
Working Example 9	(s1)	56.06	(h2)	3	29.27	91.6	37.6	96.2	282	0.95	28.5
Working Example 10	(s1)	56.06	(h2)	5	27.27	91.1	37.0	113.5	309	0.97	33.9
Working Example 11	(s1)	56.06	(h2)	7	25.27	91.6	36.3	143.3	292	1.09	34.5
Comparative Example 1	(s1)	56.06	HEAA	1	31.27	82.0	41.0	85.5	369	1.05	30.2
Comparative Example 2	(s1)	56.06	HEAA	2	30.27	43.8	42.0	81.4	306	0.93	33.9
Comparative Example 3	(s1)	56.06	HEAA	3	29.27	18.7	43.6	88.7	324	0.93	36.6
Comparative Example 4	(s1)	56.06	HEAA	5	27.27	17.7	42.2	87.0	302	0.91	27.8
Comparative Example 5	(s1)	56.06	HEAA	7	25.27	11.8	41.1	89.1	292	0.81	32.4
Comparative Example 6	(s1)	56.06	HEAA	12	20.27	8.6	41.1	102.5	186	0.85	38.6

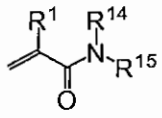
56.06	HEAA	7	25.27	3.3	44.0	68.1	213	1.02	54.4
56.06	HEAA	12	20.27	3.9	43.6	65.3	256	1.01	61.7

10	42±2	55	103±7	50±8
8	83±33	45	117±7	57±4

CLAIMS

1. A silicone hydrogel obtained by polymerizing a polymerization mix containing a plurality of monomers containing about 30 to about 98 weight % of at least one silicone monomer; and about 1 to about 50 weight % of at least one non-silicone (meth)acrylamide monomer represented by

[FORMULA 1]



(c0),

wherein R^1 is hydrogen or methyl;

at least one of R^{14} and R^{15} is a C1-20 alkyl group substituted with at least one hydroxyl group, and

with the proviso that when;

i) one of R^{14} and R^{15} is hydrogen

ii) the other of R^{14} and R^{15} is substituted with at least two hydroxyl groups,

wherein said weight percent based upon total amount of monomer components and polymer components in the monomer mix.

2. The silicone hydrogel according to Claim 1, wherein said non-silicone (meth)acrylamide monomer comprises two or more hydroxyl groups.

3. The silicone hydrogel according to Claim 1, wherein said non-silicone (meth)acrylamide monomer comprises one hydroxyl group and no amide hydrogen.

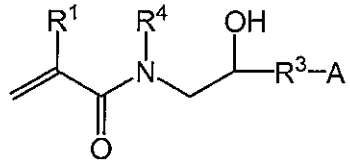
4. The silicone hydrogel according to any of Claim 1 to Claim 3, wherein the polymerization mix further comprises about 1 to about 30 weight % of at least one hydrophilic polymer with a molecular weight of about 1000 or more; wherein said weight percent is based upon total amount of monomer components and polymer components in the monomer mix.

5. The silicone hydrogel according to Claim 1, wherein, the silicone monomer comprises at least one silicone (meth)acrylamide monomer, and the silicone (meth)acrylamide monomer and non-silicone (meth)acrylamide monomer are present in the monomer mix in an amount of about 90% or more by weight with respect to a total amount of the monomer components in the monomer mix.

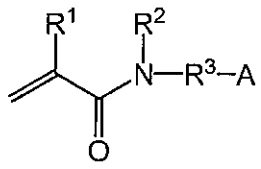
6. The silicone hydrogel according to any one of Claims 1 to Claim 5, wherein the silicone monomers have at least one hydroxyl group.

7. The silicone hydrogel according to Claim 5, wherein the silicone (meth)acrylamide monomer is represented by the following general formula (a1) or (a2):

[FORMULA 2]



(a1)

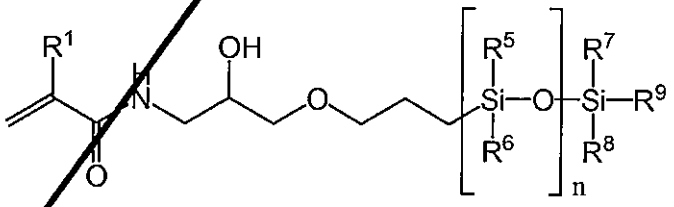


(a2)

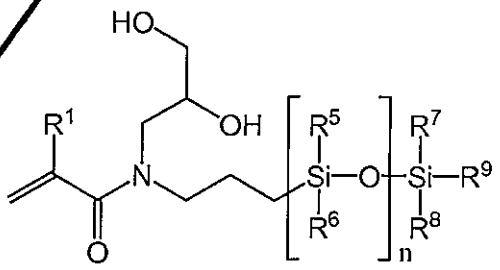
wherein in the chemical formulae (a1) and (a2), R^1 independently represents a hydrogen atom or a methyl group;R^2represents an alkyl group having between 1 and 20 carbon atoms and having at least one hydroxyl group; R^3independently represents an alkylene group with between 1 and 20 carbon atoms or an arylene group having between 6 and 20 carbon atoms, which may have substitution groups;R^4represents H, an aryl group or alkyl group with between 1 and 20 carbon atoms which may have substitution groups; and A represents a siloxanyl group.

8. The silicone hydrogel according to Claim 5, wherein the silicone (meth)acrylamide monomer is represented by the general formulae (b1) or (b2):

[FORMULA 3]



(b1)

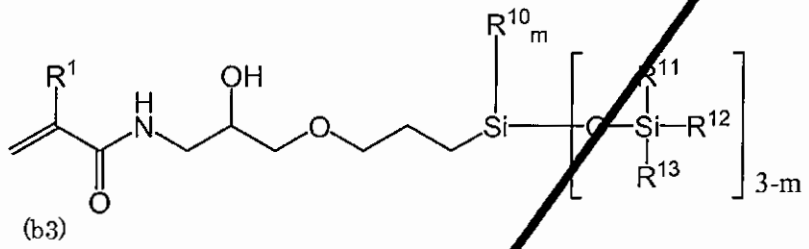


(b2)

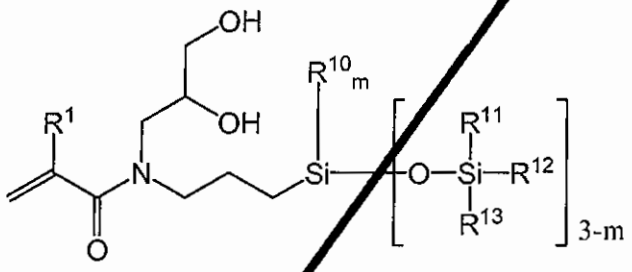
wherein in the chemical formulae (b1) or (b2), R^1 independently represents a hydrogen atom or a methyl group;R^5 to R^9 independently represent alkyl groups with between 1 and 20 carbon atoms or aryl groups with between 6 and 20 carbon atoms; and n is a natural number in the range from 1 to 50).

9. The silicone hydrogel according to Claim 5, wherein the silicone (meth)acrylamide monomer is represented by the general formulae (b3) or (b4):

[FORMULA 4]



(b3)

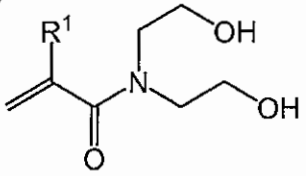


(b4)

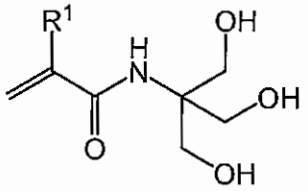
wherein in the chemical formulae (b3) or (b4), R^1 independently represents a hydrogen atom or a methyl group;R^{10} to R^{13} independently represent alkyl groups with between 1 and 20 carbon atoms or aryl groups with between 6 and 20 carbon atoms; and m is a natural number in the range from 0 to 2.

10. The silicone hydrogel according to any one of Claim 1 to Claim 9, wherein the non-silicone (meth)acrylamide monomer is represented by any one of the following general formulae (c1) to (c3):

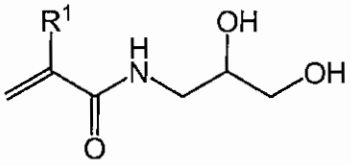
[FORMULA 5]



(c1)



(c2)



(c3)

wherein in the chemical formulae (c1) to (c3), R^1 independently represents a hydrogen atom or a methyl group.

11. The silicone hydrogel according to Claim 4, wherein, the at least one hydrophilic polymer is selected from a group consisting of poly-N-vinyl pyrrolidone, poly-N-vinyl-2-piperidone, poly-N-vinyl-2-caprolactam, poly-N-vinyl-3-methyl-2-caprolactam, poly-N-vinyl-3-methyl-2-piperidone, poly-N-vinyl-4-methyl-2-piperidone, poly-N-vinyl-4-methyl-2-caprolactam, poly-N-vinyl-3-ethyl-2-pyrrolidone, poly-N-vinyl-4,5-dimethyl-2-pyrrolidone, polyvinyl imidazole, poly-N-vinyl formamide, poly-N-vinyl (methyl)acetamide, poly-N-methyl-N-vinyl (methyl)acetamide, poly-N-vinyl-N-methylpropionamide, poly-N-vinyl-N-methyl-2-methylpropionamide, poly-N-vinyl-2-methylpropionamide, poly-N-vinyl-N,N'-dimethylurea, poly-N, N-dimethyl acrylamide, poly-N, N-diethyl acrylamide, poly-N-isopropyl acrylamide, polyvinyl alcohol, polyacrylate, polyethylene oxide, poly-2-ethyl oxazoline, heparine, polysaccharide, poly-acryloyl morpholine, and mixtures and copolymers thereof.

12. The silicone hydrogel according to Claim 4, wherein the at least one hydrophilic polymer is selected from a group consisting of polyvinyl pyrrolidone, poly(N,N-dimethyl acrylamide), poly-N-vinyl (methyl)acetamide, polyacrylate, polyvinyl alcohol, and copolymers thereof.

13. The silicone hydrogel according to Claim 5, wherein the composition amount of the (meth)acrylamide monomer with respect to the total amount of monomer components in the monomer mix is 95% or more by weight.

14. The silicone hydrogel according to any one of Claim 1 to Claim 13, wherein, the monomer mix further comprises about 1 to about 50 weight % at least one

non-silicone (meth)acrylamide monomer having no hydroxyl group .

15. The silicone hydrogel according to Claim 14, wherein, the non-silicone (meth)acrylamide monomer having no hydroxyl group is selected from a group consisting of (meth)acrylamide, N,N-dimethyl (meth)acrylamide, N,N-diethyl (meth)acrylamide, N-isopropyl (meth)acrylamide, (meth)acryloyl morpholine, and N-methoxy methyl (meth)acrylamide.

16. A medical device made from the silicone hydrogel described in any one of Claim 1 to Claim 15.

17. The medical device according to Claim 16, wherein the medical device is contact lenses, artificial corneas, endoscopes, catheters, transfusion tubes, gas transport tubes, stents, sheaths, cuffs, tube connectors, access ports, drainage bags, blood circuits, wound covering material, and medicine carriers.

18. An ophthalmic lens made from a silicone hydrogel described in any one of Claims 1 to Claim 15.

19. A contact lens made from a silicone hydrogel described in any one of Claims 1 to Claim 15.

20. The silicone hydrogel of claim 1 wherein R is selected from the group consisting of C1-10 alkyl groups substituted with at least one hydroxyl group.

21. The silicone hydrogel of claim 1 wherein R is selected from the group consisting of C1-6 alkyl groups substituted with at least one hydroxyl group.

56.06	(h2)	2	30.27	91.1	37.7	97.9	276	1.01	35.9
56.06	(h2)	3	29.27	91.6	37.6	96.2	282	0.95	28.5
56.06	(h2)	5	27.27	91.1	37.0	113.5	309	0.97	33.9
56.06	(h2)	7	25.27	91.6	36.3	143.3	292	1.09	34.5
56.06	HEAA	1	31.27	82.0	41.0	85.5	369	1.05	30.2
56.06	HEAA	2	30.27	43.8	42.0	81.4	306	0.93	33.9
56.06	HEAA	3	29.27	18.7	43.6	88.7	324	0.93	36.6
56.06	HEAA	5	27.27	17.7	42.2	87.0	302	0.91	27.8
56.06	HEAA	7	25.27	11.8	41.1	89.1	292	0.81	32.4
56.06	HEAA	12	20.27	8.6	41.1	102.5	186	0.85	38.6

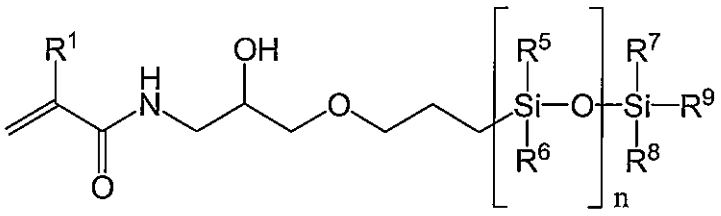
56.06	HEAA	7	25.27	3.3	44.0	68.1	213	1.02	54.4
56.06	HEAA	12	20.27	3.9	43.6	65.3	256	1.01	61.7

10	42±2	55	103±7	50±8
8	83±33	45	117±7	57±4

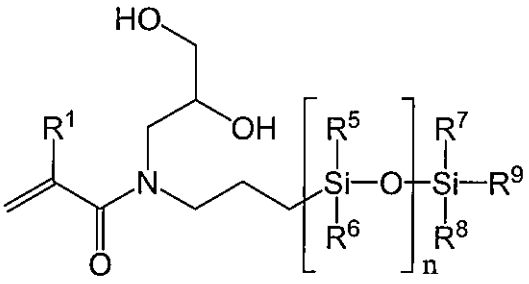
Claims

1. A silicone hydrogel obtained by polymerizing a polymerization mix containing a plurality of monomers containing (a) about 30 to about 98 weight % of at least one silicone monomer represented by the general formulae (b1), (b2):

[FORMULA 3]



(b1)

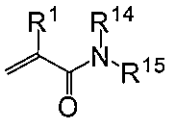


(b2)

wherein in the chemical formulae (b1) or (b2), R^1 independently represents a hydrogen atom or a methyl group;R^5 to R^9 independently represent alkyl groups with between 1 and 20 carbon atoms or aryl groups with between 6 and 20 carbon atoms; and n is a natural number in the range from 1 to 50); and

(b) about 1 to about 50 weight % of at least one non-silicone (meth)acrylamide monomer represented by

[FORMULA 1]



(c0),

wherein R^1 is hydrogen or methyl;

at least one of R^{14} and R^{15} is a C1-20 alkyl group substituted with at least one hydroxyl group, and

with the proviso that when;

i) one of R^{14} and R^{15} is hydrogen

ii) the other of R^{14} and R^{15} is substituted with at least two hydroxyl groups,

wherein said weight percent based upon total amount of monomer components and polymer components in the monomer mix and wherein the silicone (meth)acrylamide monomer and non-silicone (meth)acrylamide monomer are present in the monomer mix in an amount of about 90% or more by weight with respect to a total amount of the monomers in the monomer mix.

2. The silicone hydrogel according to Claim 1, wherein said non-silicone (meth)acrylamide monomer comprises two or more hydroxyl groups.

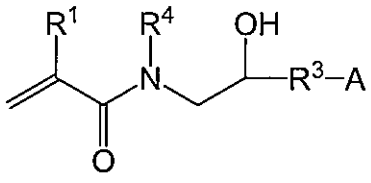
3. The silicone hydrogel according to Claim 1, wherein said non-silicone (meth)acrylamide monomer comprises one hydroxyl group and no amide hydrogen.

4. The silicone hydrogel according to any of Claim 1 to Claim 3, wherein the polymerization mix further comprises about 1 to about 30 weight % of at least one hydrophilic polymer with a molecular weight of about 1000 or more; wherein said weight percent is based upon total amount of monomer components and polymer components in the monomer mix.

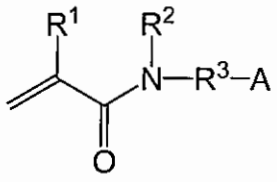
5. The silicone hydrogel according to any one of Claims 1 to Claim 3, wherein the silicone monomers have at least one hydroxyl group.

6. The silicone hydrogel according to Claim 1, wherein the silicone (meth)acrylamide monomer is represented by the following general formula (a1) or (a2):

[FORMULA 2]



(a1)

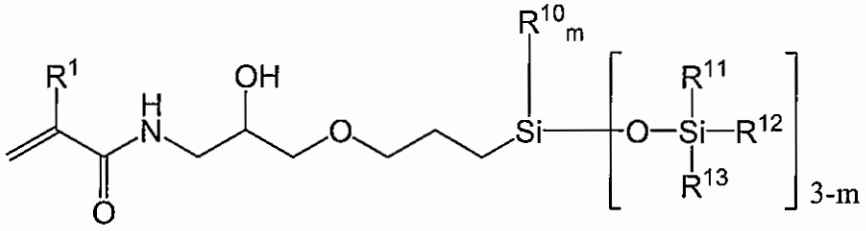


(a2)

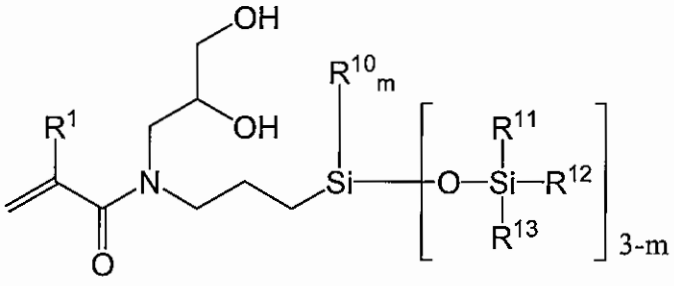
wherein in the chemical formulae (a1) and (a2), R^1 independently represents a hydrogen atom or a methyl group;R^2represents an alkyl group having between 1 and 20 carbon atoms and having at least one hydroxyl group; R^3independently represents an alkylene group with between 1 and 20 carbon atoms or an arylene group having between 6 and 20 carbon atoms, which may have substitution groups;R^4represents H, an aryl group or alkyl group with between 1 and 20 carbon atoms which may have substitution groups; and A represents a siloxanyl group.

7. The silicone hydrogel according to Claim 1~~5~~, wherein the silicone (meth)acrylamide monomer further comprises at least one additional silicone (meth)acrylamide represented by the general formulae (b3) or (b4):

[FORMULA 4]



(b3)



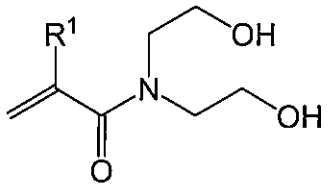
(b4)

wherein in the chemical formulae (b3) or (b4), R^1 independently represents a hydrogen atom or a methyl group;R^{10} to R^{13} independently represent alkyl groups with

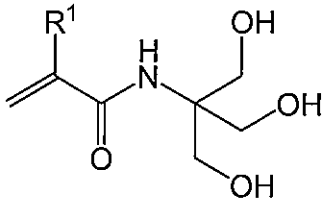
between 1 and 20 carbon atoms or aryl groups with between 6 and 20 carbon atoms; and m is a natural number in the range from 0 to 2.

8. The silicone hydrogel according to any one of Claims 1-3, 6, or 7, wherein the non-silicone (meth)acrylamide monomer is represented by any one of the following general formulae (c1) to (c3):

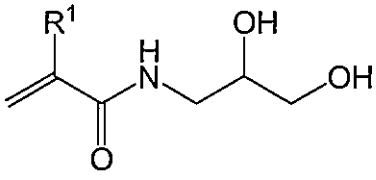
[FORMULA 5]



(c1)



(c2)



(c3)

wherein in the chemical formulae (c1) to (c3), R^1 independently represents a hydrogen atom or a methyl group.

9. The silicone hydrogel according to Claim 4, wherein, the at least one hydrophilic polymer is selected from a group consisting of poly-N-vinyl pyrrolidone, poly-N-vinyl-2-piperidone, poly-N-vinyl-2-caprolactam, poly-N-vinyl-3-methyl-2-caprolactam, poly-N-vinyl-3-methyl-2-piperidone, poly-N-vinyl-4-methyl-2-piperidone, poly-N-vinyl-4-methyl-2-caprolactam, poly-N-vinyl-3-ethyl-2-pyrrolidone, poly-N-vinyl-4,5-dimethyl-2-pyrrolidone, polyvinyl imidazole, poly-N-vinyl formamide, poly-N-vinyl (methyl)acetamide, poly-N-methyl-N-vinyl (methyl)acetamide, poly-N-vinyl-N-methylpropionamide, poly-N-vinyl-N-methyl-2-methylpropionamide, poly-N-vinyl-2-methylpropionamide, poly-N-vinyl-N,N'-dimethylurea, poly-N, N-dimethyl acrylamide,

poly-N, N-diethyl acrylamide, poly-N-isopropyl acrylamide, polyvinyl alcohol, polyacrylate, polyethylene oxide, poly-2-ethyl oxazoline, heparine, polysaccharide, poly-acryloyl morpholine, and mixtures and copolymers thereof.

10. The silicone hydrogel according to Claim 4, wherein the at least one hydrophilic polymer is selected from a group consisting of polyvinyl pyrrolidone, poly(N,N-dimethyl acrylamide), poly-N-vinyl (methyl)acetamide, polyacrylate, polyvinyl alcohol, and copolymers thereof.

11. The silicone hydrogel according to Claim 1, wherein the composition amount of the (meth)acrylamide monomer with respect to the total amount of monomer components in the monomer mix is 95% or more by weight.

12. The silicone hydrogel according to any one of Claims 1-3, 6, 7, or 9-11, wherein, the monomer mix further comprises about 1 to about 50 weight % at least one non-silicone (meth)acrylamide monomer having no hydroxyl group .

13. The silicone hydrogel according to Claim 12, wherein, the non-silicone (meth)acrylamide monomer having no hydroxyl group is selected from a group consisting of (meth)acrylamide, N,N-dimethyl (meth)acrylamide, N,N-diethyl (meth)acrylamide, N-isopropyl (meth)acrylamide, (meth)acryloyl morpholine, and N-methoxy methyl (meth)acrylamide.

14. A medical device made from the silicone hydrogel described in any one of Claims 1-3, 6, 7, 9-11, or 13.

15. The medical device according to Claim 14, wherein the medical device is contact lenses, artificial corneas, endoscopes, catheters, transfusion tubes, gas transport tubes, stents, sheaths, cuffs, tube connectors, access ports, drainage bags, blood circuits, wound covering material, and medicine carriers.

16. An ophthalmic lens made from a silicone hydrogel described in any one of Claims 1-3, 6, 7, 9-11, 13, or 15.

17. A contact lens made from a silicone hydrogel described in any one of Claims 1-3, 6, 7, 9-11, 13 or 15.

18. The silicone hydrogel of claim 1 wherein R^{14} are R^{15} are independently selected from the group consisting of C1-10 alkyl groups substituted with at least one hydroxyl group.

19. The silicone hydrogel of claim 1 wherein R^{14} are R^{15} are independently selected from the group consisting of C1-6 alkyl groups substituted with at least one hydroxyl group.