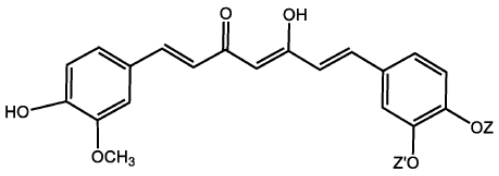
CLAIMS

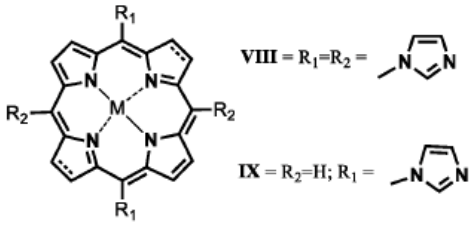
1) A process for obtaining functionalized polymer surfaces comprising the steps of:

a) dissolution of a photosensitizer of Formula PS1 or PS3:



PS1

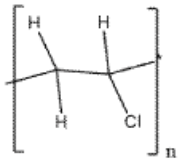
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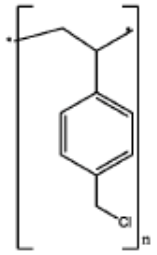
PS3

with a base, in an organic solvent selected from dimethylformamide (DMF), dimethoxyethane (DME), tetrahydrofuran (THF), dimethylpyrrolidone, dichloromethane, ethyl acetate or dimethyl sulfoxide (DMSO);

b) immersing a polymeric or co-polymer material of Formula MP1 or Formula MP2:



MP1



MP2

, ;

in the solution obtained in step (a), at a temperature from 0°C to 40°C;

c) nucleophilic substitution reaction between a leaving group (X) selected from Br, Cl, I or F of the polymeric materials MP1 or MP2 and a nucleophilic group (Y) selected from OH, N- or SH present in the photosensitizer molecules PS1 or PS3, performed in the selected organic solvents, for duration selected from 0.5 to 48 hours;

d) drying the surface functionalized polymer (MPn-PSm), preferably at room temperature and under vacuum.

2) The process for obtaining functionalized polymer surfaces according to claim 1, wherein the base of step (a) is selected from triethylamine, 1,8-diazabicyclo[5.4.0]undec-7-ene (DBU), 1,5 diazabicyclo[4.3.0]non-5-ene (DBN), pyridine or, preferably, selected from $CaCO_3$, $CeCO_3$, NaOH, KOH, $Ba(OH)_2$, $Al(OH)_3$, $Mg(OH)_2$, $Be(OH)_2$, $Ca(OH)_2$.

3) The process for obtaining functionalized polymer surfaces according to claim 1, wherein the organic solvent of step (a) is preferably dimethyl sulfoxide (DMSO).

4) The process for obtaining functionalized polymer surfaces according to claim 1, characterized in that step (b) is preferably carried out in the absence of oxygen.

5) The process for obtaining functionalized polymer surfaces according to claim 1 further comprising, after the step of step (c), one to ten supplementary washing steps of the material with organic solvents, preferably DMSO.

6) The process for obtaining functionalized polymer surfaces according to claim 1 further comprising, after step (c), a supplemental step of washing with a lower boiling organic solvent, preferably ethanol.

7) The process for obtaining functionalized polymer surfaces according to claim 1, characterized in that step (d) is preferably carried out in the absence of oxygen and light.

8) Functionalized polymeric material obtained by the process described by claims 1 to 7, and constituted by at least one polymeric surface MP1, characterized in that the halogen-leaving groups of said surface are bond by stable chemical bonds (D) of the ether type (O), thioether (S) or amine (NH), to the photosensitizer molecules PS1 or PS3.

9) Functionalized polymeric material obtained by the process described by claims 1 to 7 and constituted by at least one polymeric surface MP2, characterized in that the halogen-leaving groups of said surface are bond by stable covalent chemical bonds (D) of the ether type (O), thioether (S) or amine (NH), to the photosensitizer molecules PS1, or PS3.

10) The functionalized polymeric material of claim 8, wherein the polymeric surface is MP1 and the photosensitizer molecule is PS1.

11) The functionalized polymeric material of claim 9, wherein the polymeric surface is MP2 and the photosensitizer molecule is PS1.

12) A functionalized polymeric material according to claim 8, characterized in that said one or more polymer surfaces MP1 are of vinyl polyhalide type containing leaving groups fluorine (F), chlorine (Cl), bromine (Br) or iodine (I), preferably chlorine (Cl).

13) The functionalized polymeric material of claim 9, wherein said one or more polymer surfaces MP2 are of the type (halomethyl)polystyrene containing leaving groups fluorine (F), chlorine (Cl), bromine (Br) or Iodine (I), preferably chlorine (Cl).

14) The functionalized polymeric material of claim 8, wherein the MP1 is preferably a polyvinyl chloride (PVC), with leaving groups (X), where X can be a halogen atom.

15) The functionalized polymeric material of claim 9, wherein the MP2 is preferably a (chloromethyl)polystyrene with leaving groups (X), where X can be a halogen atom.

16) The functionalized polymeric material according to claim 8 or 9, characterized in that the photosensitizer molecule PS1 constituent is of the type (1E,6E)-1,7-bis(4-hydroxy-3-methoxyphenyl)-1,6-heptadiene-3,5-dione, also called curcumin.

17) The functionalized polymeric material of claim 16, wherein the photosensitizer molecule PS1 constituent can bind to curcumin (Z) or (Z′) derivatives.

18) The functionalized polymeric material according to claim 8 or 9, characterized in that the photosensitizer molecule PS3 is a functionalized porphyrin with nucleophilic groups of the amine type; or its reduced derivatives chlorins and bacteriochlorins.

19) The functionalized polymeric material according to claim 8 or 9, characterized by the fact that the photosensitizer molecules of the curcumin type (PS1) and of the tetrapyrrolic macrocycle type PS3 have a nucleophile group (Y).

20) The functionalized polymeric material of claim 19, wherein the nucleophile group (Y) is OH, N- or SH.

21) The functionalized polymeric material according to claim 8 or 9, characterized in that it exhibits antimicrobial action in the absence of light, and more pronounced in the presence of light at a specific wavelength in the range of 400 to 850 nm.

22) The functionalized polymeric material as defined in claims 8 to 21, characterized in that it is used in the preparation and production of polymeric biomedical devices.

23) The use of the functionalized polymeric material of claim 22, wherein the biomedical devices are medical devices selected from the list: endotracheal tubes, probes, catheters, reservoirs, tracheostomy cannula, intravenous infusion scalp, nasal catheter for oxygen, hemodialysis catheter, rectal probe, packages for transport and storage of organs, urethral probe or probe for tracheal aspiration.

24) The use of the functionalized polymeric material of claim 23, wherein the biomedical device is preferably an endotracheal tube.