Claims

1. A film (5) comprising a first surface (4) comprising at least one first region (1) comprising a first active agent and at least one second region (2) comprising a second active agent different from the first active agent,

   wherein the at least one first region (1) is capable of contacting at least one tooth of a subject and the at least one second region (2) is capable of simultaneously contacting a gum of the subject.

2. The film (5) of claim 1, wherein the film (5) is dissolvable after administration of said film (5) in the oral cavity, wherein, preferably, the film (5) is substantially dissolved after 1-240 min.

3. The film (5) of any of the preceding claims, wherein the first region (1) is adjacent to the second region (2) in the first surface (4).

4. The film (5) of any of the preceding claims, wherein said first region (1) is formed by a first sheet (10) and said second region (2) is formed by a second sheet (20), wherein surfaces of said first and second sheets (10, 20) together form the first surface (4).

5. The film (5) of any of claim 4, wherein said first sheet (10) or said second sheet (20) is overlapping 10-100% of the respective other region.

6. The film (5) of claim 4, wherein the first sheet (10) and the second sheet (20) are abutting each other.

7. The film (5) of any of claims 1-2 or 4-6, wherein the first and the second sheets (10, 20) are distanced by a spacer region (3), wherein the spacer region (3) is configured to inhibit diffusion of at least one of the active agents from one region into the other region,

   optionally, wherein the first region (1), the second region (2), and, if present, the spacer region (3) are regions of the same sheet forming the film (5).

8. The film (5) of any of the preceding claims, wherein the first sheet (10) and the second sheet (20) forming the first surface (4) are arranged on a backing layer (30) forming a second surface (6) opposite to the first surface (4),

wherein, optionally, the backing layer (30) is configured to inhibit diffusion of at least one of the active agents towards the oral mucosa of the subject.

9. The film (5) of claim 8, wherein at least one selected from the group consisting of the backing layer (30), the spacer region (3), the first region (1), and the second region (2) is configured to release ions upon administration to the at least one tooth and the gum,

optionally, wherein the film comprises a battery (31), e.g., a bio-battery.

10. The film (5) of any of the preceding claims, wherein the film (5) or at least one sheet thereof comprises a polymeric material and/or a hydrogel as a matrix material,

wherein the matrix material optionally comprises a vinyl polymer, polyacrylate, PEEK (polyether ether ketone) polymer, carbopol, natural polymer, or copolymers thereof, or pectin coated liposomes.

11. The film (5) of any of the preceding claims, wherein the film (5) or at least one sheet thereof comprises polyvinyl acetate (PVA), polyvinylpyrrolidone (PVP) and/or hydroxy-propylmethylcellulose (HPMC), optionally, PVA.

12. The film (5) of any of the preceding claims, wherein the film (5) or at least one sheet thereof comprises PVP.

13. The film (5) of any of the preceding claims, wherein the film (5) or at least one sheet thereof comprises HPMC.

14. The film (5) of any of the preceding claims, wherein the film (5) or at least one sheet thereof comprises a plasticizer, optionally, glycerol or PEG-400, preferably, glycerol.

15. The film of claim 14, wherein the weight percentage of plasticizer per weight of polymer and plasticizer is 0-15%, preferably, 0-5%.

16. The film (5) of any of the preceding claims, wherein the first active agent is selected from the group consisting of a peroxide, an agent capable of generating a peroxide, a self-assembling peptide, CPP-ACP, mineral particles, and fluoride.

17. The film (5) of any of the preceding claims, wherein the second active agent is selected from the group consisting of an anti-inflammatory agent, a senolytic agent, a botanical agent, an anti-bacterial agent, and a self-assembling peptide.

18. The film (5) of any of the preceding claims, wherein at least the first region (1) comprises a self-assembling peptide comprising the consensus sequence SEQ ID NO: 1, X1-X2-X1-X2-X1, wherein X1 is independently selected from the group consisting of glutamic acid, aspartic acid, glutamine and ornithine, and X2 is independently selected from the group consisting of alanine, valine, isoleucine, leucine, methionine, phenylalanine, tyrosine, tryptophan and glutamine,

    wherein the self-assembling peptide preferably has at least 80% sequence identity to SEQ ID NO: 6, and most preferably, comprises SEQ ID NO: 6.

19. The film of claim 18, wherein the self-assembling peptide is in monomeric form.

20. Use of the pharmaceutical film (5) of any of the preceding claims in the manufacture of a pharmaceutical composition for treating at least one periodontal or dental disease or disorder selected from the group consisting of caries, mucositis, gingivitis, periodontitis, peri-implantitis and tooth discoloration in a subject.

21. A cosmetic method of treating a subject, using the film (5) of any of claims 1 to 19, comprising contacting at least one tooth of the subject with the first region (1) of the film and contacting at least a region of the gum of the subject with the second region (2) of the film.

22. A method of preparing the film (5) of any of claims 1-19, optionally, comprising 3-dimensional printing of the film (5) in an individualized manner, taking the size and form of teeth and, optionally, the conditions or disorders and their severity of the subject into account.