and nanoparticles aggregate is of at least 7 g/cm^3, the nanoparticle or nanoparticles aggregate consisting in an inorganic material comprising a single metal element or a mixture of metal elements, the inorganic material having an atomic number Z of at least 40, each of said nanoparticle and of said nanoparticles aggregate being covered with a biocompatible coating; ii) the nanoparticles and/or nanoparticles aggregates concentration is of at least about 1% (w/w); and iii) the apparent viscosity at 2s^{-1} of the gel comprising nanoparticles and/or nanoparticles aggregates, is between about 0.1 Pa.s and about 1000 Pa.s when measured between 20°C and 37°C; and wherein the treatment of cancer comprises a step of exposing a target biological tissue of the subject to the gel wherein said gel delineates the target biological tissue and the gel-delineated target biological tissue is to be irradiated.

In another embodiment, there is provided a kit comprising a biocompatible gel comprising nanoparticles and/or nanoparticles aggregates as described herein, wherein the biocompatible gel and the nanoparticles and/or nanoparticles aggregates are in distinct containers.

DETAILED DESCRIPTION

Inventors now provide an advantageous composition which considerably improves targeted tissue delineation, in particular tumor bed delineation, without impacting on targeted tissue volume changes, typically when considering a tumor bed, on tumor bed volumes changes or on post lumpectomy tissue remodeling. In the context of the invention, the tumor bed is tissue covering the cavity obtained following tumor resection.
The composition of the invention further advantageously allows an at least 10% increase of energy (radiation) dose deposit on the tumor bed, i.e. without increasing the energy dose deposition in surrounding healthy tissues.

A first object relates to a biocompatible gel comprising nanoparticles and/or nanoparticles aggregates, wherein i) the density of each nanoparticle and of each nanoparticles aggregate is of at least 7 g/cm^3, the nanoparticle or nanoparticles aggregate comprising an inorganic

CLAIMS

1. Use of a biocompatible gel in the manufacture of a medicament for treating cancer, wherein the biocompatible gel comprises nanoparticles and/or nanoparticles aggregates, wherein i) the density of each nanoparticle and nanoparticles aggregate is of at least 7 g/cm^3, the nanoparticle or nanoparticles aggregate consisting in an inorganic material comprising a single metal element or a mixture of metal elements, the inorganic material having an atomic number Z of at least 40, each of said nanoparticle and of said nanoparticles aggregate being covered with a biocompatible coating; ii) the nanoparticles and/or nanoparticles aggregates concentration is of at least about 1% (w/w); and iii) the apparent viscosity at $2s^{-1}$ of the gel comprising nanoparticles and/or nanoparticles aggregates, is between about 0.1 Pa.s and about 1000 Pa.s when measured between 20°C and 37°C; and wherein the treatment of cancer comprises a step of exposing a target biological tissue of the subject to the gel wherein said gel delineates the target biological tissue and the gel-delineated target biological tissue is to be irradiated.

2. The use according to claim 1, wherein the nanoparticles and/or nanoparticles aggregates concentration is between about 1.5% and 10% (w/w).

3. The use according to claim 1 or 2, wherein the inorganic material is a metal, an oxide, a sulfide, or any mixture thereof.

4. The use according to any one of claims 1 to 3, wherein the nanoparticle or nanoparticles aggregate further comprises at least one targeting agent.

5. The use according to any one of claims 1 to 4, wherein the gel is an hydrogel.

6. The use according to any one of claims 1 to 5, wherein, when the gel is applied on a target biological tissue, nanoparticles and/or nanoparticles aggregates of the biocompatible gel allow a at least about 10% increase of the radiation dose deposit on said target biological tissue when exposed to ionizing radiations, when compared to the dose deposit on the same biological tissue in the absence of said gel.

7. The use according to claim 6, wherein the applied ionizing radiation dose is between 2 KeV and 25 MeV.

8. The use according to claim 7, wherein the ionizing radiation is selected from X-rays, gamma rays and electron beam.

9. The use according to any one of claims 6 to 8, wherein the gel allows the delineation and visualization of at least 40% of the target biological tissue.

10. The use according to any one of claims 1 to 9, wherein the biological tissue is a tumor bed.

11. The use according to claim 10, wherein the tumor bed is the tissue covering the cavity obtained following tumor resection.