## CLAIMS

1. A hydrogel comprising a radiopaque polymer, said radiopaque polymer comprising 1,2-diol or 1,3-diol groups acetalised with a radiopaque species.

2. A hydrogel according to claim 1 wherein the hydrogel is a cross-linked polymer network.

3. A hydrogel according to claim 1 or 2 wherein the hydrogel comprises polyvinyl alcohol (PVA) or copolymers of PVA.

4. A hydrogel according to any of claims 1 to 3 wherein the radiopaque species is acetalised in the hydrogel in the form of a cyclic acetal.

5. A hydrogel according to any of claims 1 to 4 wherein the radiopaque species comprises iodine or bromine.

6. A hydrogel according to claim 5 wherein the radiopaque species comprises an iodinated or brominated phenyl group.

7. A hydrogel according to either of claims 5 or 6 wherein the hydrogel comprises greater than 20% iodine by dry weight.

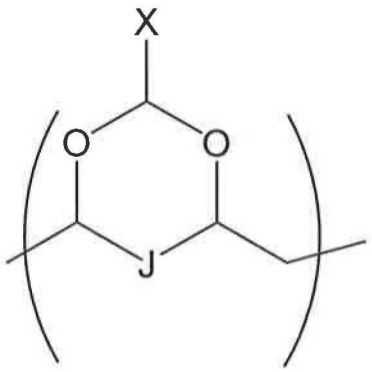
8. A hydrogel according to any preceding claim wherein the hydrogel is in the form of microparticles or microspheres.

9. A hydrogel according to claim 8 wherein the hydrogel is in the form of microspheres with a mean diameter size range of from 10 to 2000μm.

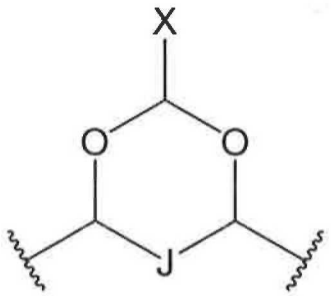
10. A hydrogel according to any preceding claim in the form of microspheres or microparticles having a mean radiopacity of 500HU or greater.

11. A hydrogel according to any preceding claim wherein the hydrogel has a net charge at physiological pH.

12. A hydrogel according to any of claims 1 to 11 wherein the structure of the 1,2-diol or 1,3-diol groups acetalised with a radiopaque species is of the general formula I or II




I




II

wherein X is a group substituted by one or more halogens and preferably one or more iodine moieties and J is a group of the formula $-CH_2-$ or is a bond.

13. A hydrogel according to claim 12 wherein X is a group of the formula

ZQ III

wherein Z is a linking group, or is absent, such that Q is directly bonded to the cyclic acetal;

21. A method according to claim 20 wherein the radiopaque species is an iodinated aldehyde.

22. A method according to claim 21 wherein the radiopaque species is an iodinated benzyl aldehyde, iodinated phenyl aldehyde or an iodinated phenoxyaldehyde

23. A method of making a radiopaque hydrogel microsphere comprising the steps of:

(a) swelling a pre-formed hydrogel microsphere comprising a polymer with 1,2-diol or 1,3-diol groups in a solvent capable of swelling said microsphere; and

(b) mixing the swollen beads with a solution of a radiopaque species capable of forming a cyclic acetal with said 1,2 or 1,3 diols under acidic conditions; and

(c) extracting the microspheres.

24. A method according to claim 23 which further comprises the step of drying the extracted microspheres

25. A method according to either of claims 23 or 24 in which the reaction is conducted in polar organic solvent and at a temperature greater than 25 °C.

26. A method according to any of claims 23 to 25 in which the radiopaque species comprises a functional group selected from the group consisting of aldehydes, acetals, hemiacetals thioacetals and dithioacetals.

27. A method according to any of claims 23 to 26 in which the radiopaque species comprises iodine.

28. A method according to claim 27 wherein the radiopaque species is an iodinated aldehyde.

29. A method according to claim 28 wherein the radiopaque species is an iodinated benzyl aldehyde, an iodinated phenyl aldehyde or an iodinated phenoxyaldehyde

30 A method according to claim 29 wherein the radiopaque species is 2,3,5-triiodobenzaldehyde, 2,3,4,6-tetraiodobenzyaldehyde or 2-(2,4,6-triiodophenoxy)acetaldehyde

31. Use of a hydrogel according to any of claims 1 to 13 or a composition according to either of claims 14 or 15 for the manufacture of a medicament for the embolization of a blood vessel of a patient.

32. The use according to claim 31 in which the blood vessel is associated with solid tumour.

33. The use according to claim 32 in which the tumour is hepatocellular carcinoma.

34. A hydrogel according to any of claims 1 to 13 for use in embolization of a blood vessel.

35. A composition according to either of claim 14 or 15 for use in embolization of a blood vessel