Claims

1. A method of forming a fibre composite component (10), the method comprising:

   providing a plurality of first fibres (102), the first fibres being arranged in a plurality of layers (104a-e) with an uncured heat curable resin matrix (106) being provided therebetween, the resin matrix comprising a plurality of second electrically conductive fibres (108) suspended therein comprising a length extending along a long axis, the second fibres having a shorter length than the first fibres;

   applying an energy field to the resin matrix to thereby align the second fibres such that their long axis is orientated in a direction normal to the layers of first fibres, so that they provide an electrically conductive path between adjacent layers of first fibres to form an electrically conductive fibre network; and

   applying an electric current through the electrically conductive fibre network to thereby heat and cure the resin matrix.

2. A method according to claim 1, wherein the energy field is applied to one or more selected regions of the resin matrix, to align only the selected regions of second fibres.

3. A method according to claim 1 or claim 2, wherein the plurality of layers of first fibres and the resin matrix are provided as a patch, and the method comprises applying the patch to a further component to be repaired prior to applying the fibre alignment and electrical heating steps.

4. A method according to any of the preceding claims, wherein the second fibres comprise one or more of carbon nano-tubes, graphene ribbons, carbon discs, carbon platelets, carbon rods, metallic fibres, and metallic flakes.

5. A method according to any of the preceding claims, wherein the method further comprises applying a ferrous coating to the second fibres.

6. A method according to claim 5, wherein the ferrous coating is applied by chemical vapour deposition.
7. A method according to claim 5 or claim 6, wherein the ferrous coating comprises one or both of Ni and COOH.
8. A method according to any of the preceding claims, wherein the second fibres comprise a length of between 1nm and 100μm.
9. A method according to any of the preceding claims, wherein the second fibres comprise a diameter of between 1nm and 200nm.
10. A method according to any of the preceding claims, wherein the energy field comprises one or more of an AC magnetic field (112), a unidirectional magnetic field, a DC electric field, and an acoustic wave.
11. A method according to any of the preceding claims, wherein the current in the electrically conductive fibre network is induced by one or both of eddy currents induced from an external AC or DC magnetic field and direct current applied directly to the part via conducting electrodes.
12. A method according to any of the preceding claims, wherein the resin comprises an uncured heat curable liquid, a gel epoxy resin, or a thermoset epoxy resin.
13. A method according to any of the preceding claims, wherein the second fibres have an aspect ratio of approximately 10.
14. A fibre composite component formed in accordance with the method of any of the preceding claims.