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54 **Electrical connector.**

57 An electrical connector for joining two or more electrical conductors, comprising a heat-shrinkable sleeve coated on at least part of its inner surface with a conductive polymer.

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ELECTRICAL CONNECTOR

This invention relates to electrical connectors, especially but not exclusively for joining the bared ends of insulated wires, and to a method of connecting electrical conductors.

In 'Research Disclosure' April 1990, page 348, there is disclosed an electric wire whose conducting medium consists of a conductive polymer - textile composite, one example being a rope whose fibres have individually been coated with polypyrrole, a conductive polymer, the rope insulated with a plastics sheath.

The purpose of the present invention is to provide some means of connecting mechanically and electrically such non-metallic electric wires; conventional techniques employing soldering or crimping are of course inappropriate.

Accordingly, the invention in one aspect provides an electrical connector for joining two or more electrical conductors, comprising a heat-shrinkable sleeve coated on at least part of its inner surface with a conductive polymer. In use, the sleeve is heat-shrunk over the bare conductors to grip them frictionally and to create an electrical joint.

In another aspect, the invention provides a method of connecting electrical conductors comprising placing a heat-shrinkable sleeve, coated on at least part of its inner surface with a conductive polymer, over the conductors, and heat-shrinking the sleeve onto the conductors to create an electrical path therebetween which includes the conductive polymer.

The connection is most conveniently made between two electric wires; in the case of insulated wires, the ends are preferably bared and the sleeve should be long enough to cover the bared ends. There may be a lengthwise gap between the conductor ends; alternatively, the ends may be butted up against each other.

However, a connector of appropriate shape, cylindrical or irregular, could be provided for connecting any number of electric wires, or electric conductors of other configuration such as strips. It is not essential for the sleeve to be cylindrical.

The sleeve is preferably of electrically-insulating heat-shrinkable polymer, so that the resulting electrical connection is insulated.

The invention is particularly useful for connecting textile-composite wires of the type described above, because an even pressure is applied around their periphery at the join, giving a good frictional grip and a strong electrical connection without crushing or interfering with the surface of the wire.

According to a third aspect, therefore, the invention provides an electrical joint comprising two

non-metallic wires interconnected electrically and mechanically by a connector comprising a heat-shrunk sleeve coated on at least part of its inner surface with a conductive polymer.

The connectors may be made by extruding thermoplastics tubing, expanding the tubing within a rigid cylindrical chamber by fluid pressure and cooling it so that it becomes heat-shrinkable, coating its inner surface with a conductive polymer, and cutting the tubing to size. The surface may be coated with conductive polymer, such as polypyrrole or polyaniline, from appropriate solvents by spraying, or else by building up a coating of the polymer from a reacting solution of the appropriate monomer, e.g. pyrrole, with an oxidising agent, e.g. ferric chloride. Such a process is described, in relation to coating textiles, in Gregory, R.V., Kimbrell, W.C and Kuhn, N.H., "Conductive Textiles", Paper presented at the International Conference on Science and Technology of Synthetic Metals, June 26th-July 2nd 1988, Santa Fe, New Mexico, and in our copending Patent Application mentioned above.

Claims

1. An electrical connector for joining two or more electrical conductors, comprising a heat-shrinkable sleeve coated on at least part of its inner surface with a conductive polymer.

2. A method of connecting electrical conductors comprising placing a heat-shrinkable sleeve, coated on at least part of its inner surface with a conductive polymer, over the conductors, and heat-shrinking the sleeve onto the conductors to create an electrical path therebetween which includes the conductive polymer.

3. A connector according to Claim 1, in which the sleeve is of electrically-insulating heat-shrinkable polymer.

4. An electrical joint comprising two non-metallic wires interconnected electrically and mechanically by a connector comprising a heat-shrunk sleeve coated on at least part of its inner surface with a conductive polymer.

5. A connector according to Claim 2 and substantially as described herein.

6. A method of connecting electrical conductors, substantially as described herein.