



UltraWire

EC FP7 Project Title: **Ultra Conductive Copper-Carbon Nanotube Wire**

Acronym: **UltraWire**

Project No. **609057**

EC FP7 Call: **FP7 - FoF.NMP.2013-10**

Start: **1st October 2013**

Duration: **3 years**

Project Aims

The most common traditional materials used in electrical energy distribution systems are copper and copper alloys. Modern applications show an increasing demand for better heat and electric current carrying capacity at the level beyond copper base materials. Nanocarbon materials, such as carbon nanotubes and graphene have attracted attention due to their high electrical, thermal conductivity and exceptional mechanical properties. It would appear that combining copper with high performance nanocarbons towards composite materials could offer immediate solution to problems encountered currently.

Copper nanocarbon composites could form the next generation of conductors, where copper contributes the benefits of electrical conductivity, whereas nanocarbon brings to this composite its low weight, flexibility, mechanical reinforcement and thermal management. Recent breakthrough in the chirality control of carbon nanotubes could contribute significantly to the electrical conductivity of these composite materials beyond the performance achieved by bulk copper conductors. The material and process costs required to achieve improvement of the overall performance of copper based electrical conductors, need to be compatible with large scale conductor manufacturing and overcome the issues such as the cost of the nanocarbons and the difficulty of scaling up the production processes.

This project is aimed at developing a copper nanocarbon composite with significantly improved overall properties, including electrical, thermal and mechanical performances over bulk copper. The proposal also aims to develop production process that will be scalable to large volume manufacture. A key breakthrough will be to achieve a continuous carbon nanotube/copper manufacturing of wires with superior properties using highly controlled carbon nanotubes and/or graphene developed at the University of Cambridge and currently produced at sufficient volumes with unique degree of structural control and molecular orientation.

Project Partners

1) University of Cambridge (UK), 2) KME (Germany); 3) Aurubis (Belgium); 4) Cambridge Nanomaterials Technology Ltd (UK); 5) Wieland-Werke (Germany) 6) Nexans (France); 7) National Grid (UK); 8) AGH University of Science and Technology (Poland); 9) Outotec (Finland); 10) Aalto University (Finland); 11) Institute of Occupational Medicine (UK); 12) PSA Peugeot Citroën (France); 13) PE Interantional; 14) Invro Limited (UK).

For more information please visit the project website www.ultrawire.eu or contact Dr Bojan Boskovic, Project Exploration, Delivery and Dissemination Manager at info@ultrawire.eu