Technology Strategy Board
Driving Innovation

Results of competition: Technology-inspired innovation - May 2014 - Advanced materials

Total available funding for this competition was £500k from the Technology Strategy Board.

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Intrinsiq Materials Limited (lead) European Thermodynamics Limited University of Warwick	DETERMINATION: Doped Thermo Electric Materials in Automotive Applications.	149,912	121,342

Project description (provided by applicants)

The current climate for improved energy efficiency is driving the automotive market to seek ways of capturing waste energy from car exhausts. This will improve fuel consumption and reduce pollution while also reducing the levels of carbon dioxide emitted. Current materials for thermoelectric (TE) generators are typically based on compounds that are scarce, expensive and environmentally unsound. Other TE materials including silicides do not suffer from these drawbacks but their peak performance lies outside of the temperature range experienced within an automotive exhaust.

DETERMINATION will address these limitations by applying Density Functional Theory (DFT) computational modelling to engineer the band gap of novel silicide thermoelectric materials. Model materials will be synthesised using plasma torch technology to deliver doped silicide thermoelectrics that exhibit superior ZT values that peak in the temperature range 200-450 oC.

Technology Strategy Board
Driving Innovation

Results of competition: Technology-inspired innovation - May 2014 - Advanced materials

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Ketonex Limited (lead) Euriscus Limited	High Performance Polymer Materials for ALM Applications (HYPERMATA)	£149,700	£112,276
Project description (provided by applicants)			
The HyperMATA project, lead by the specialist polymer development company, Ketonex, will develop a new family of high performance polymer materials intended for use in the Additive Layer Manufacturing (ALM) industry. The new polymer materials that will be developed will have significantly better mechanical and thermal properties over those presently available. This 14 month project will demonstrate that, with some simple modifications, a standard laser sintering machine will be able to produce high quality parts, with exceptional strength and chemical resistance. End users from a wide range of industries, including bioengineering, aerospace and the automotive industry, will all benefit from the significantly improved performance that this material will lend to ALM parts.			

Technology Strategy Board
Driving Innovation

Results of competition: Technology-inspired innovation - May 2014 - Advanced materials

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Oxford nanoSystems Limited (lead) Thermacore Europe Ltd	ECHiPCHeP - Electronics Cooling via Hi Performance Coated Heat Pipes	£149,760	£112,320

Project description (provided by applicants)

Heat Pipes are vital to the thermal management of high performance silicon chips and are present in virtually every new laptop computer.

Thermacore is a world leader in heat pipe technology and specialise in thermal management of high performance electronic devices such as for military applications. To protect and expand its position at the high end of the market, Thermacore Europe (TCE) and Oxford nanoSystems (ONS) have, with Brunel University (BU), identified an opportunity to improve the maximum heat flux of a heat pipe by replacing or augmenting the current internal evaporative cooling surface with a high performance nano-coating.

The expected benefits including higher power, lower weight and lower cost will allow the UK to maintain its lead in this high value part of the electronics market and the partners to expand into new areas of heat and energy management.

Technology Strategy Board
Driving Innovation

Results of competition: Technology-inspired innovation - May 2014 - Advanced materials

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Twincon Limited (lead) University of Sheffield	Recycled Tyre Polymer Fibre for use as an additive in fresh concrete	£130,165	£103,980

Project description (provided by applicants)

Polypropylene fibres are introduced in to fresh concrete in vast quantities for a variety of beneficial reasons which improve the performance of the concrete in both its fresh and hardened states. These beneficial effects are well established and highly valued resulting in the use of an estimated 75,000 tonnes of virgin polypropylene in the EU alone each year.

At the same time an estimated 63,000 tonnes of polymer fibre is recovered from end-of-life tyres every year which is too contaminated with fine rubber dust to find any alternative use and is generally disposed of by incineration. This project will examine the technical and commercial feasibility of using recycled tyre polymer fibre as an admixture in fresh concrete. This will require the transfer of fibre cleaning and sorting technologies from the textile industry and some advanced polymer characterisation and high temperature testing.

If successful, this will enable the virgin polypropylene fibre currently used as a concrete additive to be replaced with a recycled product of equal or better performance thereby providing a possible annual reduction of 0.5m tonnes of CO2 in an EU market worth about £100m/yr. alone.