Innovate UK

Results of Competition: Materials & Manufacturing Round 2 24-36 Months
Competition Code: 1611_MM_R2

Total available funding is up to £5m for this stream (£15m total competition budget)

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
Lucite International UK Ltd	Sweet Perspex	£852,062	£426,031
Ingenza Limited		£349,932	£244,952
University of Nottingham		£399,693	£399,693

Project description - provided by applicants

Polymethylmethacrylate (pMMA) is a transparent polymer, most familiar in the form of Perspex, used to make screens for phones, computers and TVs. pMMA is non-toxic, so it is used in contact lenses, medicine and dentistry. It is also used to manufacture parts for cars and aircraft, bathroom/kitchen units and fittings, and in paints and resins. Like all plastics, pMMA is made from oil-derived feedstocks. We have developed a lab-scale, bio-based route to manufacture the monomer for pMMA, methylmethacryalate (MMA). The new process uses renewable sugars instead of oil, and will generate about one fifth of the CO2 emissions compared with petrochemical MMA. To do this, we engineered bacteria to produce the enzymes needed to convert sugars to a derivative of MMA. This synthetic chemical is not usually formed by enzymes, so the artificial metabolic pathway was developed using directed evolution and synthetic biology. The product can be separated easily from the fermentation, and we developed a simple, sustainable chemical process to convert it to MMA. In this project, we will integrate synthetic biology, fermentation technology and chemical process development to take this process from lab scale experiments to a pilot scale manufacturing process.

Note: you can see all Innovate UK-funded projects here
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escubed limited	Enabling Manufacture of Designer Emulsions and Functional Particles	£486,777	£340,744
International Paint Ltd		£503,733	£251,867
University of Leeds		£339,401	£339,401

Project description - provided by applicants

Microcapsules are ubiquitous in everyday life and are found in products used in crop protection, drug delivery, personal care, cosmetics etc. All microcapsules contain an active ingredient protected by the capsule shell for a multitude of purposes including safety, taste masking, stability and targeted delivery. To improve the performance of the capsule (in terms of stability and delivery behaviour) the capsule size distribution needs to be as narrow as possible, which is currently very difficult to achieve on industrial scales using existing manufacturing processes. Adapting microfiltration technologies to create membrane emulsification is a currently under-exploited manufacturing route that will enable the large-scale production of capsules with tightly controlled size distributions, leading to products with improved release properties at a cost that industry can afford. The technology will be tested on a specific high-value coatings application. The project is led by a small dynamic company, escubed limited who will work closely with researchers at the University of Leeds to develop the membrane technology for industrial use and will demonstrate its applicability to pilot plant scale at International Paint, a global leader in coatings technologies.

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Oxford Lasers Limited	(UltraWELD) ULTRAfast laser WELDing of highly dissimilar materials – development of a truly industrial process	£499,110	£349,377
Glass Technology Services Ltd		£130,516	£91,361
Coherent Scotland Limited		£89,584	£44,792
Heriot Watt University		£274,948	£274,948
Centre for Process Innovation Limited		£78,809	£78,809
Gooch & Housego (UK) Ltd		£124,972	£62,486

Project description - provided by applicants

Project UltraWELD will develop photonic based processes for highly dissimilar material joining in manufacturing of complex electro optics devices for defence/aerospace applications and OLED lighting. Ultrafast (i.e. pico- or femto-second pulsed) laser welding of glass to metals is proposed as an alternative to other bonding techniques that currently fail to provide a satisfactory solution on demanding requirements for device hermetic sealing and suffer from device degradation due to outgassing of volatile components in adhesives. We will develop new ultrafast laser processes for dissimilar material joining (microwelding) and also design and build a flexible custom laser prototype machine capable of applications development to demonstrate such laser microwelding in key selected real devices at TRL level 6. The project will directly benefit all five industry partners by enabling early adoption of this technology from end users, to enhance product competitiveness by increasing reliability and in-service lifetime and reduce cost of ownership.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Ford Motor Company Ltd	New volume production casting process for AMC reinforced components.	£219,368	£109,684
Composite Metal Technology Limited		£1,073,300	£751,310
M.Wright & Sons Ltd		£333,060	£199,836

Project description - provided by applicants

Ford Motor Company (Ford), Composite Metal Technology (CMT) and M Wright &Sons (MWS) are collaborating on an Innovate UK funded project to develop a new manufacturing process for the production of aluminium castings reinforced with inserts manufactured from long-fibre aluminium matrix composite (AMC) materials, providing localised reinforcement and facilitating weight reduction. The project will deliver a new gravity die casting process for AMC-reinforced components, enabling higher production volumes at improved quality and reduced cost compared to the current sand casting process. MWS will support this development with a novel 3D fibre preform design concept, manufactured using a new adaptive weaving system that will allow flexible transverse reinforcement of preforms, modified according to component performance requirements. These developments will be demonstrated via the manufacture of a redesigned prototype powertrain bracket, with reduced weight and improved stiffness versus the standard aluminium component. The project will address one of the remaining inhibitors to widespread adoption of AMC reinforcement for aluminium components, and unlock the technology potential for customers in a broad range of industrial sectors.

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