

Project Specification

Tender details – the opportunity

Company name	Addionics Ltd
Company address	Translation and Innovation Hub 84 Wood Lane London W12 0BZ
Description of company activity/SIC code	Activity: development of novel battery components based on 3D architecture. Code: 74909
Objective of the proposed innovation project– this MUST involve activity that results in the development of or introduction to the market of a new product or service (max 300 words)	<p>Addionics is working on the development of smart 3D structures for battery applications. Current battery systems employ planar structures as current collectors, but this means a compromise between power and energy density. By changing the structure of the current collector from planar to 3D the surface contact with the active material is maximised and the battery performance improved. The use of 3D structures increases the energy density and charge/discharge rate of a battery. It also minimises the risk of thermal runaway, and this improves the safety and lifetime of the battery. The technology is aimed mainly at the automotive market but can be incorporated in other fields such as consumer electronics, computers, aviation, etc.</p> <p>We have the capability to design and produce 3D metal structures but lack the ability and expertise to carry out comprehensive studies to characterize their mechanical properties. We would benefit from a partnership with an engineering department that can help us develop a robust methodology for the evaluation of the mechanical properties of our 3D current collectors. That would include the design of tensile and tension/compression tests and interpretation of the data. These data will be essential in determining what structures can withstand the battery assembly process.</p>

Company's current situation – existing project team and innovation project development stage (max 400 words)

Addionics was created in 2017 by Drs Moshiel Biton, Vladimir Yufit and Farid Tariq, battery researchers and material scientist from Imperial College London. The company is focused on developing 3D current collectors that can be incorporated into existing battery technologies and manufacturing lines. We are also developing specialist codes for the design and optimisation of our structures prior to their fabrication. This way they can be tailored to match the properties required for their end-use. This two-way approach helps to overcome current battery limitations related to their electrochemical, thermal and mechanical performances. The potential of our technology has been demonstrated by the use of 3D structures in coin and pouch cells. These cells showed an improved performance and cycle life than conventional systems containing 2D current collectors.

Our structures should be mechanically strong, yet flexible, to withstand the calendaring process (in battery manufacturing) and volume changes associated to charge/discharge processes with no or minimum deformation. We have advanced capabilities in relation to fabrication technology but are limited in terms of analyses and characterisation of our products. We need to ensure that the 3D current collectors we produce are mechanically stable before their being used in any battery system. By collaborating with a partner that has the expertise we currently lack we hope to advance the stage of our technology from "developing" to "implementation in the market".

On Addionics side, the project will be assisted by Drs Enrique Ruiz Trejo and Belen Bello Rodriguez, electrochemists at the R&D laboratory in London. Dr Farid Tariq (CTO) will be the main supervisor.

<p>Business need – what expertise and support is required from a Knowledge Base to reach the objective(s) above? (max 400 words)</p>	<p>We need a partner with expertise in mechanical testing and materials characterisation. We need to gather information about:</p> <ul style="list-style-type: none"> • Elasticity of the structures • Maximum force they can support before cracking / collapsing • Where does mechanical failure occur and how does it propagate? • Relationship between mechanical strength and structural morphology <p>This will involve tension/compression, elongation and indentation tests. The data produced is essential for the transition of our products to the market; it will enable us to determine which structures are most advantageous in terms of mechanical properties.</p>
<p>Please list six key words that describe your potential project, i.e. ICT, engineering, biotech etc.</p>	<p>Batteries, electric mobility, engineering, mechanical testing</p>
<p>Required timescales (if any) for Project Start and duration, and if applicable anticipated product launch date</p>	<p>The ideal duration will be 1 year, with the work split in quarters:</p> <p>Q1: development of a methodology for the mechanical testing of porous copper and aluminium samples</p> <p>Q2: design and commissioning of any relevant instrumentation or accessory that may be required for investigating porous structures</p> <p>Q3: application of the method(s) to the analysis of in-house fabricated specimens</p> <p>Q4: fabrication and testing of batteries incorporating Addionics technology</p>
<p>Optional - company budget available to match fund KEEP+ grant (if known) please see 'Further details' for maximum funding amounts</p>	<p>£30,000</p>
<p>Company Contact for further information</p>	<p>Dr. Enrique Ruiz-Trejo enrique@addionics.com</p> <p>Dr. Belen Bello Rodriguez belen@addionics.com</p>

Required tender response date (min 20 working days from posting of advert)	11 October 2021
<p>Responses are sought from organisations classified as Knowledge Bases, defined under the ERDF Definition of the Knowledge Base: Higher Education, Further Education and Research Entities which are: UK Public Sector Research Establishments, Research and Development Organisations, Research and Technology Organisations.</p> <p>The Company is seeking a Knowledge Base partner to work with them to develop a project which, dependent on a successful Grant Application, will be supported by the KEEP+ ERDF project using one of the two types of intervention described below. Please also see KEEP+ website – www.keepplus.co.uk</p> <p>In Stage 2, if the grant application to KEEP+ is successful, the Company requires the expertise of the Knowledge Base partner, to work with them to deliver the solution i.e. the project intervention supported by the KEEP+ grant.</p>	
Criteria for Decision making	<p>Assessment criteria are as follows</p> <ul style="list-style-type: none"> • Expertise fit 50% • Timing fit 25% • Suitability of proposed methodology 25%
Date for Contract Decision	Minimum of 20 working days from date of advertisement
Tender response templates	Please approach the company for the exact format of your response.

Further details for potential respondents

You are responding to a tender for an activity which is eligible for part funding by the European Regional Development Fund, specifically under the KEEP+ Programme.

The KEEP+ Programme aims to support SMEs to develop new products and services by fostering long term collaborative relationships between Knowledge Bases – Universities and research institutions – and SMEs who need expertise and support for innovation.

Please see KEEP+ website for further information www.keepplus.co.uk or contact the KEEP+ project team 0845 196 4207 julie.benabdeljelil@anglia.ac.uk or 0845 196 4985 kayleigh.parkes@anglia.ac.uk

KEEP+ provides maximum allowable grants for its specific types of intervention. Those intervention types and maximum grant levels are as follows;

- KEEP Knowledge Exchange Embed Partnership (typically 12 months' duration) - this intervention involves a graduate working on a mid- to long-term activity with the support of a specific academic staff member, the graduate is based within the beneficiary company - grant allowance 50% of eligible costs and £10,000 capital.
- KEEP Research and Innovation Collaboration (no fixed duration) this intervention involves an academic colleague working on a short- to long-term activity, they are based at the Knowledge Base but with regular face-to-face interaction with the beneficiary company - grant allowance 50% of eligible costs plus a strict maximum of £10,000 capital.

The following is a guide to the types of cost that you should expect to occur should your application be successful;

- KEEP Knowledge Exchange Embed Partnership (typically 12 months' duration) – project development, associate wage, academic wage, administrative support, training and travel (on the part of the knowledge base employees), minor equipment (please note there is a potential separate grant for major capital purchases), recruitment
- KEEP Research and Innovation Collaboration (no fixed duration) – project development, academic wage, administrative support, consumables (please note there is a potential separate grant for major capital purchases)