

## COOPERATION OFFER

### GENERAL DESCRIPTION

Fabrication of high-performance diamond coated materials, to be used in technical application.

#### Summary

The company, issuing this offer, is located in Zaragoza (Spain). The company's activities are focused on obtaining synthetic diamonds and diamond coatings by using highly advanced technological processes.

The company can offer its own technology for diamond coatings synthesis, which can provide material for a wide range of applications, e.g. aerospace industry, electronics or optics.

The ideal cooperation partner would be interested in improving the properties of their products by using diamond coating.

#### Description

The Spanish company, issuing this offer, is a cutting-edge start-up founded in October 2014. Its activities are focused on obtaining synthetic diamond and diamond coatings by using highly advanced technological processes.

The company's own technology for diamond coatings synthesis allows producing virtually any type of diamond material. The company commercializes a wide range of products regarding both, synthetic diamond crystals and coatings for industrial applications and jewellery.

The core business is focused on diamond materials development and technology transfer to adapt the company's products to customer requirements, while always working in close collaboration with the customer. The company's ambition is to expand its technologies to a large number of sectors to provide new possibilities to its clients.

Up-to-date, materials are suffering, when worked under very extreme conditions; temperature, pressure or friction. Conventional materials do not provide all technical requirements necessary. Thus, material science is seeking constantly to develop and incorporate high-performance materials in this field.

The aim of the sought cooperation is to produce materials with superior properties by combining diamond coatings with materials that need to be reinforced (e.g. metal, ceramics or glass pieces). The potential of these new composites lies in three aspects:

- Diamond is transparent in a wide range of wavelengths from UV to the far infrared. Together with its mechanical properties diamond makes an ideal material for optical applications in combination with quartz.
- Diamond combines an exceptional thermal conductivity, in the range of 2200 - 2500 W/mK, and chemical stability, withstanding higher temperature around 1700°C in inert atmosphere. Therefore, critical pieces can be covered for heat spreading or reinforcing materials, which are subjected to environmental extreme conditions, strong impacts or friction.
- The incorporation of dopants as boron and nitrogen were developed during the last years. Conductive diamond can be synthesised including dopants to the diamond structure, which are behaving as a semiconductor with exceptional properties. This can be of great value for the electronic industry.

The company is searching for partners with the objective of exploring possible future lines of collaboration in the field of diamond coatings and engineering. The partner should provide a material, which could benefit from a combination with unique diamond properties and which the company can advance in the deposition control over different substrates.

## Advantages and Innovations

High thermal conductivity, from 1000 to 2000 W/mK is one of the distinguishing features of diamond. This characteristic can play an important role in heat dissipation. In the particular case of cutting tools, the tool tip temperature is inversely proportional to its thermal conductivity. The mean thermal conductivity of the coated tools depends on the diamond film thickness and increases up to 60% compared to the metal substrate.

In terms of mechanical properties, it is possible to tune the performance of the material by varying the thickness of the coating. In particular, the hardness can be increased two or three times, growing a 1 µm layer of diamond. The values approximate diamond properties (tensile strength ≈ 100 GPa and Young's modulus ≈ 1000 GPa) when the layer of coating is up to 5 µm. This means higher resistance to corrosion and attrition as well as a lower coefficient of friction in the whole area and thickness (from 0.05 to 0.15 depending on crystal orientation).

Diamond is transparent in a wide range of wavelengths from UV to the far infrared and which combines with mechanical properties. It makes diamond coatings an ideal combination for optical applications.

The company is able to deliver to the market a high-quality product and competitive price, making it accessible to different applications.

## Current Stage of Development\*

- |   |  |
|---|--|
| <input type="checkbox"/> Under development /laboratory tested   | <input type="checkbox"/> Field tested / evaluated              |
| <input checked="" type="checkbox"/> Available for demonstration | <input type="checkbox"/> Prototype available for demonstration |
| <input type="checkbox"/> Already on the market                  | <input checked="" type="checkbox"/> Concept stage              |

### Comments Regarding Stage of Development:

Pilot plant working / Scaling-up to an industrial production capacity

## Intellectual Property Rights Status\*:

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> Patent(s) applied for but not yet granted | <input type="checkbox"/> Secret know-how                                 |
| <input type="checkbox"/> Granted patents                                      | <input type="checkbox"/> Exclusive rights                                |
| <input type="checkbox"/> Copyright  | <input type="checkbox"/> Trade Marks                                     |
| <input type="checkbox"/> Design rights  | <input type="checkbox"/> Others (registered design, plant variety, etc.) |

### Comments Regarding IPR Status: (e.g. countries for which protection has been granted or applied for)

European Union

**Preferred Countries for Dissemination: European Union, United States, Mexico, Australia, China, Japan, South Africa, India and Russia.**

## DETAILS OF YOUR OWN ORGANISATION/COMPANY

Type\*  Industry  R&D Institution  University  Private Inventor

Other: please specify

### Comments:

Organisation/Company Size\* (please tick one box)  < 10 employees  11-50 employees

51-250 employees  251-500 employees  > 500 employees

Year Established: 2014

Turnover (only for business profiles):  < 1 mio  1 – 10 mio

10 – 20 mio  20 – 50 mio  50 - 100 mio



**Already Engaged in Trans-National Cooperation**  Yes  No

**Experience Comments:** Highly qualified multidisciplinary team with extensive experience in R & D advisory services, product development and implementation of the technology in customer technology, always working hand by hand. The CEO of the company is responsible for commercial and technical support. The technical department is supervised by 2 engineers & 3 PhD researchers, experts in CVD reactors, and which are also involved in R+D department.

**Certification Standards:** In process of implementing the ISO 9001, 14001 and 166002 standards for its certification during the third quarter of 2019

**Languages Spoken:** English, Spanish, Russian, Portuguese, French and Catalan.

## COLLABORATION DETAILS

### Type of partnership considered:

#### Technology Offers

- Commercial Agreement with technical assistance (an agreement arranging the acquisition of a product/technology paired with the provision of a number of services in support of a transfer of technology)
- Joint Venture Agreement
- License Agreement
- Technical co-operation agreement
- Research co-operation agreement

#### Business Offers

- Distribution services agreement
- Acquisition agreement
- Franchise agency agreement
- Manufacturing agreement
- Outsourcing agreement
- Subcontracting
- Financial agreement
- Services Agreement

### **Type and Role of Partner Sought\*:**

- Type of partner sought (*such as industry, academy, research organisation*):  
Industry, Technological Centres
- Specific area of activity of the partner (*example: manufacturer/distributor/user/disposal of plastic packages etc.*):  
Manufacturer / distributor / Photonics & Laser industry/ user et al.
- Tasks to be performed by the partner sought: What expertise/ tasks do you expect from the partner?

Regarding manufacturers the company can offer to increase the values of their products. The company wishes to obtain different substrates to be covered by diamond.  
Distributors can offer their distribution services to implement the company's technique in different applications and markets.  
End users and final developers to implement the technology in their value chain. Product Development

**Size and Type of Partner Sought (e.g. industry, research):** SMEs/ big companies & Technological Centres

**Additional information (pictures)**



## CONTACT

Please contact the RespiceSME coordinator Samantha Michaux for the contact data of the company.

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