

# **Research Fellowship in Components Technology and Space Materials**

## **Directorate of Technical and Quality Management**

### **ESTEC, Noordwijk, The Netherlands**

#### **ESA/RF-ESTEC(2015)023**

#### **Overview of the Division's mission**

The Components Technology and Space Materials Division, within the Product Assurance and Safety Department, primarily covers Materials and Electrical, Electronic and Electromechanical (EEE) components technology and development, reliability assessment and industrialisation. It is responsible for the technical management of materials and components space evaluation, verification and qualification.

The work proposed will be carried out within the Materials Technology Section. The activities performed within the remit of the Materials Technology Section include:

- The qualification for space flight of all advanced materials (ceramics, composite materials, glasses, metallic, polymeric) as well as all related manufacturing, coatings and surface treatment processes for all ESA spacecraft and launchers Programmes
- The development of revolutionary materials and innovative manufacturing technologies both internally and in cooperation with other space agencies and organisations
- The failure investigation of materials and processes underperforming and impacting ESA space missions
- The development, certification and support of new European industrial capabilities, manufacturing processes and manpower skills training related to space applications of materials and components
- The establishment and implementation of requirements and standards for the development and the procurement of space grade materials and manufacturing processes
- The development, maintenance and improvement of the European Space Materials Database, storing all relevant data generated for materials and processes intended for Space use

In order to achieve its objectives, the Materials Space Evaluation and Radiation Effects Sections as well as the Materials Technology Section have also direct access to the world leading ESTEC Materials and Electrical Components Laboratory, covering the full spectrum of materials characterisation as well as space environmental simulation and testing capabilities.

## **Overview of the field of research proposed:**

Spacecraft operate in a hostile environment (vacuum, extreme temperature, UV/VUV radiation, particle radiation, synergistic effects ...) where the materials used to build spacecraft must function and keep functioning without degradation or where degradation is understood such that during operation the functional properties of the materials are not impacting the mission. The effect of the space environment on materials is still of major concern and our knowledge needs to be continually expanded in order to improve the design, reliability and safety of launchers, spacecraft and space instruments.

In recent years, the selection of materials, processes and technologies for space missions has been driven by the increasing need to lower manufacturing, testing and verification costs coupled with rapid advances in the performance requirements for scientific instruments and more stringent international regulations.

## **Proposed activity: Ground based space simulation for in orbit performance prediction of spacecraft materials**

During exposure to vacuum, especially at elevated temperature levels, volatile chemicals contained in many components of a spacecraft (e.g. CFRP panels, adhesives, paints, harness) may, over time, migrate to the surface, via diffusion, and escape, via desorption. In extreme temperature environments, organic materials tend even to decompose into simpler substances. The interaction of contamination with critical surfaces is a major concern for the reliable performance of space missions. Especially under the influence of UV/VUV radiation unexpected processes may happen that may impact the performance of space missions.

The aim of this research is to experimentally develop new methodologies assessing the interaction of contamination, radiation and assess the performance of spacecraft materials for future space missions.

## **Who can apply**

The programme is open to suitably qualified women and men. Preference will be given to applications submitted by candidates within five years of receiving their PhD.

The Research Fellow Programme is open to nationals of the following states: Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland, and the UK, or Canada as a Cooperating State, Bulgaria, Estonia, Hungary, Latvia, Slovakia and Slovenia as European Cooperating States (ECS).

### **Required qualifications**

Applicants must have recently completed their PhD studies in Materials Science, Applied Physics, Applied Chemistry or Physical Chemistry.

Applicants should have good analytical and communication skills and should be able to work in a multi-cultural environment in an autonomous manner.

Applicants must be fluent in English and/or French, the working languages of the Agency. A good proficiency in English is required.

### **How to Apply**

Please fill in the [online](#) application form attaching to it, **in one document only**, your CV, your motivation letter and your research proposal.

Candidates must also arrange for up to **three letters of reference** to be sent by e-mail, before the deadline, to **temp.htr@esa.int**. The letters must be sent by the referees themselves. The candidate's name must be mentioned in the subject of the email.

Applications satisfying the general conditions for eligibility, to be submitted **by 6 May 2015**, will be evaluated and successful applicants will be invited for an interview.

Interested candidates are highly encouraged to visit the ESA website: [www.esa.int](http://www.esa.int).