

## ***Job description***

### **PhD candidate position: “*Dielectric film capacitors for pulse-power energy storage applications*”**

We are looking for a motivated and skilled PhD-candidates to carry out advanced, thin film physics research on dielectric thin films. Our aim is to develop understanding in depositing high performance energy-storage capacitors based on dielectric films using physical method such as pulsed-laser deposition.

Pulsed laser deposition (PLD) has emerged as a versatile technique for the deposition of high-quality, epitaxial thin films from a wide variety of complex oxide materials, including superconductors, metals, ferroelectrics, ferromagnets, dielectrics, and their multilayers. The PLD technique, used broadly in research laboratories worldwide, is conceived as relatively simple, mainly because of the fact that the heating source for evaporation (ablation), i.e. a powerful laser, is located outside the process chamber.

### **Challenge**

Your goal is to develop the key material science required for growing, characterizing, and modeling dielectric thin films for pulse-power energy storage applications. The dielectric film capacitors will be used in the Transmit-pulse in Radar (Radar Transmitters). This includes:

- Exploring the layer growth processes engineering of dielectric thin films, using physical vapor deposition techniques such as pulsed laser deposition and others, aiming for high breakdown electric field and energy storage performance of dielectric film capacitors.
- Developing models for relating the doping elements (high-entropy) and multilayers to the structure and energy storage properties of the dielectric thin films.
- Developing the understanding of the piezoelectric film structures and their functional properties using characterization techniques such as AFM, XRD, SEM, TEM and Ferroelectric tester, charge-discharge measurements and detailed data analysis.

### **Specific Requirements**

- You have a MSc degree in physics, materials science, physical chemistry or a related field.
- You have affinity with the physical vapor deposition of dielectric thin films and their structural and electrical characterization.
- Knowledge on the fabrication of ceramic powders and ceramic targets is one of the advantages.

- You are an excellent team player in an enthusiastic group of scientists and engineers working on a common theme.
- You are creative, like to push boundaries, and are highly motivated to address a major science challenge in thin film physics.
- You are fluent in English and able to collaborate intensively with industrial and academic parties in regular meetings and work visits.

### **Our offer**

- You will be appointed on a fulltime position for 4 years.
- As a PhD candidate at UT, you will be appointed to a full-time position for (04) four years, with a qualifier in the first year, within a very stimulating and exciting scientific environment;
- The University offers a dynamic ecosystem with enthusiastic colleagues;
- Your salary and associated conditions are in accordance with the collective labour agreement for Dutch universities (CAO-NU);
- You will receive a gross monthly salary ranging from €3.059,- (first year) to € 3881,- (fourth year);
- There are excellent benefits including a holiday allowance of 8% of the gross annual salary, an end-of-year bonus of 8.3%, and a solid pension scheme;
- The employer can provide up to a maximum of 30% of the gross salary to the employee as a tax-free cost allowance.
- A minimum of 29-day holidays based on a formal workweek of 40 hours, and numerous professional and personal development programs.

### **Employer**

**Inorganic Materials Science (IMS)** is a research group devoted to thin film growth studies, (nano)structuring techniques, and properties of complex materials, in particular oxides. It includes materials with diverse properties, like ferroelectrics, ferro-magnetics, multiferroics, piezoelectric, high-K dielectrics, transparent conducting oxides, non-linear optical materials, ion conductors, superconducting and related materials. Its research field is focused on thin films with modified properties by doping or by artificial layered structures and superstructures. Applications are found in, e.g., nano-electronics and spintronics, optical systems, energy storage, solar cells, fluidics, and bio-nano sensors.

The IMS group is embedded in the **MESA+ Institute** ([www.mesaplus.utwente.nl](http://www.mesaplus.utwente.nl)), which is one of the largest nanotechnology research institutes in the world, delivering competitive and successful high-quality research. The institute employs 500 people of

which 275 are PhD's or Postdocs. With its unique NanoLab facilities the institute holds 1250 m2 of cleanroom space and state-of-the-art research equipment.

**The University of Twente** is an equal opportunity employer which values diversity. We do not discriminate on race, religion, color, national origin, gender, sexual orientation, age, marital status, or disability status. Because of our diversity values we do particularly support women to apply.

### **Information and application**

Are you interested in this position? Please send your application to Dr. Minh Nguyen via email address ([d.m.nguyen@utwente.nl](mailto:d.m.nguyen@utwente.nl)), including:

- A motivation letter (max 1 page) emphasizing your specific interest and motivation to apply for a PhD position in our group, please indicate also when you can start the position at the earliest.
- A full CV including your publications, awards, and working experience. Your CV should demonstrate the scope of your work and education and indicate a good fit with the stated requirements for the position.
- English certificate (if possible).
- Diploma and academic transcript of BSc and MSc education.
- References (contact information) of two scientific staff members (one of whom should be the supervisor of your BSc or MSc thesis/final project) willing to provide a recommendation letter at our request.

For more information regarding this position, you are welcome to contact Dr. Minh Nguyen ([d.m.nguyen@utwente.nl](mailto:d.m.nguyen@utwente.nl)).