The Eindhoven University of Technology, department of Applied Physics, has a vacancy for a **PhD position**

Water transport through polymeric coatings into wood

Introduction

Coatings are widely applied on wooden substrates for protective and esthetical reasons. In the protection of wood against rotting the control of water migration into the wood is an important function of a coating. The permeability of the coating is intrinsically connected with its composition, structure and morphology. Since wood is a porous substrate it can significantly influence the final structure of the coating. Further, weathering by UV, temperature peaks and water also leads to structural rearrangements inside the coating. Therefore, understanding the barrier properties of a coating in relation to its composition, its substrate and its weathering conditions are of utmost importance for improving the performance of coatings on wood. Therefore AkzoNobel, the largest global paints and coatings company (www.AkzoNobel.com), TNO and the Eindhoven University have joined forces to study this topic.

Project aim and description

The aim of your work is to visualize and model water transport through water based coatings into wood. You will apply various Magnetic Resonance Imaging (MRI) tools to image water profiles in both wood and coatings during water uptake. NMR relaxation techniques will be used to determine the state of water in both the wood and the polymeric coating on top of the wood. You will connect the outcomes with information on the structure of the coating and the wood as determined by OM and SEM. Finally you will formulate mathematical models enabling predictions of water uptake in these type of systems.

Working location

You will do you work within the group Transport in Permeable Media (TPM) of the Eindhoven University of Technology, which has a long lasting experience with imaging and modeling of transport processes in porous media and coatings. The group TPM has a wide range of Magnetic Resonance Imaging facilities for materials research. You will work in close cooperation with AkzoNobel and TNO.

Requirements

- Do you want to be part of research aiming for a more sustainable future?
- Do you have a master in physics, physical chemistry or another relevant scientific discipline?
- Are you intrigued and challenged by complex applied physical problems?
- Have you worked with advanced experimental techniques?
- Do you have good programming skills (Matlab, C, C++)?

If so, you are the right candidate for this position.

Employment

The appointment is for four years. You will be an employee of the university with a competitive salary as well as excellent secondary benefits (holiday allowance, etc.). The research in this project must be concluded with the attainment of a PhD degree. A salary is offered starting at Euro 2042.- per month (gross) in the first year and increasing up to Euro 2612.- per month (gross) in the last year. Moreover 8% bonus share (holiday supplement) is provided annually, as well as a 8.3% end of year allowance. Assistance for finding accommodation can be given. TU/e offers you also the opportunity for personal development by developing your social and communication skills.

More information, applications

More information can be obtained from: Dr. ir. H.P. Huinink (H.P.Huinink@tue.nl / +31 40 2475375). You can send your application (including a cover letter, statement of research interests, a CV, and names of three references) by email. Information about the group Transport in Permeable Media can be found at: http://www.phys.tue.nl/TPM/