Nanophotonic solar cell

Research
This project aims to approach 46.7% ultimate efficiency limit of a solar cell by using nanophotonic engineering. Based upon our recent paper (Nano Lett 16, 6467 2016), we will investigate tapered nanowire arrays. We intend to optimize the internal radiative efficiency by using proper surface passivation. The next challenge is to optimize the light extraction efficiency by optimizing nanowire tapering. Starting from our present 17.8% world-record nanowire solar cell, it is our objective to closely approach the 33.7% Shockley Queisser limit. The final challenge is to try to beat the Shockley Queisser limit by nanophotonic engineering

Job description
The selected candidate will perform groundbreaking applied research towards very high efficiency nanowire solar cells. The candidate will fabricate nanowire arrays by either top-down etching or bottom-up growth within the NanoLab@TU/e cleanroom. These nanowires should subsequently be optimized using photoluminescence spectroscopy. FDTD simulations will guide in the nanowire optimization process. As a final step, the nanowires will be processed into nanowire solar cells and their efficiency will be certified.

Location
The work will be performed in the Photonics and Semiconductor Nanophysics group at the Eindhoven University of technology (TU/e). This group has a leading international position in the area of Semiconductor Nanophysics, Nanophotonics and Nanowires, and is part of the COBRA research institute.

Requirements
For the PhD position, we seek a highly talented, enthusiastic, and exceptionally motivated candidates with an MSc degree in Physics. Interest in materials science, solid-state physics and/or cleanroom experience is highly desirable. The candidate must have strong communication skills, including fluency in written and spoken English.

Conditions of Employment
When fulfilling a PhD position at the FOM Foundation, you will get the status of junior scientist. You will have an employee status and can participate in all the employee benefits FOM offers. You will get a contract for four years. Your salary will be up to a maximum of 2,834 euro gross per month. The salary is supplemented with a holiday allowance of 8 percent and an end-of-year bonus of 8.33 percent. You are supposed to have a thesis finished at the end of your four year term with FOM. A training programme is part of the agreement. You and your supervisor will make up a plan for the additional education and supervising that you specifically need. This plan also defines which teaching activities you will be responsible (up to a maximum of ten percent of your time). The conditions of employment of the FOM Foundation are laid down in the Collective Labour Agreement for Research Centres (Cao-Onderzoekinstellingen), more exclusive information is available at this website under Personeelsinformatie (in Dutch) or under Personnel (in English).
General information about working at FOM can be found in the English part of this website under Personnel. The ‘FOM job interview code’ applies to this position.
Contact
dr. Jos Haverkort
Eindhoven University of Technology (TU/e)
Dept. of Applied Physics
P.O.Box 513, 5600 MB Eindhoven
The Netherlands
J.E.M.Haverkort@tue.nl
+31 (0)40 247 4205
http://www.phys.tue.nl/psn/

Closing time
15-01-2017