

Postdoc Researcher (m/f/d): Hydration-Governed Colloidal Stability for Sustainable Nanocellulose

Deadline
10.12.2025

Start of work
01.01.2026

Working time model
Full-time

About us

The Department of Sustainable and Bioinspired Materials (Director Prof. Dr. Silvia Vignolini, (<https://www.mpikg.mpg.de/sbm>)) at the Max Planck Institute of Colloids and Interfaces (MPICI) in Potsdam Science Park, Germany, is seeking a highly motivated Postdoctoral Researcher to drive an ambitious project on the cellulose-water interface and eco-efficient production of cellulosic nanomaterials. Your research will bridge sustainable processing with fundamental colloid science to further enhance the sustainability of bio-based material building blocks.

This project is embedded in the broader mission of our institute and part of the Max Planck Society's Sustainability Network "SusMax" (<https://www.susmax.org/>), which aims to push the boundaries of renewable materials through cutting-edge fundamental insight into colloidal science, precision interfacial engineering, and deep mechanistic understanding.

Your tasks and qualifications

We are looking for a highly motivated researcher with a PhD in chemistry or materials science and with a research background in soft matter, surface and interface science, materials characterization, or physical chemistry. You enjoy combining careful experimentation with quantitative analysis and collaborating across disciplines.

The successful candidate stands high chance to have proven experience with colloids/soft matter and surface/interfacial characterization; several of hands-on skills with several of the following: scattering techniques such as SAXS/WAXS or neutron methods, spectroscopic or optical methodologies, surface and interface characterizations such as XPS, AFM (incl. force mapping), QCM-D, or ITC; strong data analysis and scientific writing skills; ability to work independently and in teams in an interdisciplinary setting; research experience with nanocellulose is advantageous but not required.

The successful candidate will be responsible for driving innovation across several key research areas:

- Conduct innovative research to understand the colloidal stability of cellulose nanoparticles across different dimensions, connecting interparticle forces, hydration, and dispersion behavior.
 - Develop and evaluate physicochemical surface modifications (e.g., selective adsorption, polymer grafting/brushes, small-molecule or polysaccharide motifs) and quantify their impact on stability, assembly, and performance.
 - Design and apply surface/interfacial measurement strategies to probe polymer-nanoparticle interactions (e.g., QCM-D/AFM/ITC/ellipsometry/scattering and spectroscopies), and translate these insights into processing rules.
 - Elucidate cellulose-water interfacial structure and dynamics, linking surface hydration and specific binding to macroscopic dispersion, self-assembly, and material properties.
 - Ability for both independent and teamwork
 - Strong interest in interdisciplinary research
 - Language skills in English in speech and writing
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What we offer

- a full-time position (initially one year with possible extension) in a world-class research environment
 - a stimulating, interdisciplinary environment within the vibrant scientific community of the Max Planck Institute
 - access to cutting-edge infrastructure, including various surface and material characterization approaches
 - remuneration according to TVöD-Bund up to pay group E13
 - conditions and social benefits of the public sector
 - flexible working hours
 - compatibility of family and career (e.g. company Kindergarten)
 - subsidy for the job ticket
 - canteen, with an offer of meat, vegetarian and vegan dishes
 - outdoor sports facilities on campus
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The Max Planck Society strives for gender equality and diversity. We welcome applications from all backgrounds. The Max-Planck Society is committed to increasing the number of individuals with disabilities in its workforce and therefore encourages applications from such qualified individuals. Furthermore, the Max Planck Society seeks to increase the number of women in those areas where they are underrepresented and therefore explicitly encourages women to apply.

The position is available starting from 01.01.2026 for a period of 12 months with possible extension. The accepted candidate will work in the group led by Dr. Wenyang Xu at the Department of Sustainable and Bio-inspired Materials, with strong collaboration with the Max Planck Institute of Polymer Research.

Please submit your application using the online-application-management-tool, with attached PDF versions of your CV, including a publication list, and a short motivation letter containing your skills and experiences related to the position (max. 2 pages), a brief on your potential thoughts and contribution to the project (max. 1 page), and two references.

For further information about the Institute, see <https://www.mpikg.mpg.de/en>.