Initiative
Excellence
in Africa
100 PhDs
for Africa

University
Mohammed VI
Polytechnic

Meryem JAMAL

University Mohammed VI Polytechnic, Morocco

Research field

Biobased & Bioinspired fibers

PhD title

Design and assembly of fully biobased and bioinspired fibers through wet spinning

Summary

For many years, humans have harvested fibers directly from nature, like silk, wool, and wood. Natural fibers like silk exhibit unique mechanical properties that surpass those of synthetic polymer fibers, attributed to their hierarchical structures from the molecular to the macroscopic scale. These structures inspire researchers to develop biomimetic fibers using technologies like spinning, replicating natural processes. Lignocellulosic-based nanomaterials, from renewable sources, are of interest for their sustainability and potential for tailored properties. Despite progress, gaps remain, including understanding structure-process-property relationships, reproducibility challenges, and exploring biomass-derived nanomaterials. This project aims to address these by studying the valorization of lignocellulosic biomass into high-performance fibers. This involves examining the effects of biomass fractionation technology, selection and compatibilization through chemical modification pathways, and the assembly process on the final properties of the fibers.

Keywords

- Biomass processing
- Bioinspiration
- Spinning technology
- Fibers

Supervisor
Prof. Youssef HABIBI
UM6P, Morocco

Co-supervisor
Prof. Jeremy LUTERBACHER
EPFL