

## Adsorption of metal nanoparticles on cellulose surface

Cellulose functionalised with inorganic nanoparticles is used as an element of biosensors, in catalysis, conductive material and in the paper industry, as well as fabrics with antibacterial properties or in active and intelligent food packaging. One of the methods of biofunctionalisation of cellulose nanostructures is the introduction of metal nanoparticles (Ag, Au, Pt, Cu, Pd, Co) or metal oxides (ZnO, CuO) and carbon nanostructures (carbon nanotubes, graphene) onto the surface. There is a variety of metal nanoparticles (MNPs) that can be used as a dispersed phase in cellulose bionanocomposites. In recent decades there has been a great progress in the colloidal synthesis of inorganic nanoparticles. Colloidal metal nanoparticles are interesting because of their unique optical, electronic, magnetic and antibacterial properties. Due to their small size, large specific surface area and tunable physicochemical properties, which differ significantly from their counterparts in macroscopic form, they find application in nanocomposite materials.

Therefore, the aim is to study the nature of interactions between cellulose (microfibrillar, nanofibrillar or in the form of nanocrystals) and metallic nanoparticles, as well as investigating the properties of obtained structures.

Scientific supervisor: dr hab. Monika Szymańska-Chargot, prof. IA PAN, assistant supervisor: dr Monika Chylińska

Candidate:

- Master degree in chemistry, biology or related
- good command of English (written and spoken) ;
- basic knowledge of nanostructures synthesis, methods of surface characteristics, knowledge of molecular interactions, chemical reaction mechanisms and methods of chemical analysis
- ability to self-organization of work
- scientific achievements, ie. publications, patents, participation in scientific conferences are welcomed
- experience in conducting scientific research projects will be an advantage