Cellulose:
Old material with new functionalities

Yury Shchipunov

Institute of Chemistry, Far East Department,
Russian Academy of Sciences
Vladivostok, Russia

Cellulose is the most known and used biopolymer. Furthermore, this polysaccharide is the most abundant and renewable material of natural origin of which sustainable sources are the largest in the living nature. Mankind uses widely the cellulose over centuries and its chemistry was well developed 150 years ago. At present one may see increasing attention to this “old material” obvious from an exponential grow of publications, patents and discussions at conferences. Rekindling of great interest is explained by novel approaches inspired by the nanochemistry and nanotechnology. Their use enables one to modify and treat cellulose, improving drastically or providing novel functionalities not known before for its materials.

The aim of this talk is to consider the main facts – sources, structure, properties – about this biopolymer that make it unique in living nature and highly attractive for applications. There will be a combination of literature review and my own results. It includes such topics as preparation of nanocellulose, aerogels, their biomimicking mineralization by silica and titania for improving mechanical properties and stability of cellulose, hydrophobization for oil adsorbent fabrication and imparting photocatalytic activity to make photocatalysts and self-cleaning textile.