"Lifecycle impacts of Copper nanomaterials released from timber preserving impregnations"

An international workshop among experts from Europe, Russia and USA, organized by the EU FP7 SUN and ECONANOSORB projects

22 January 2016
University Ca' Foscari Venice
Venice, Italy

Background

Nanotechnology materials and products are increasingly being produced for their potential to provide benefits to society. Therefore, although still emerging, nanotechnology has been identified as a Key Enabling Technology by the European Union. One of its important areas of application are metal-based biocides used to protect wood against microbial and fungal decomposition. One prominent example is Copper (Cu), different forms of which (e.g micronized Cu, Copper Oxide) are used in particulate timber preserving impregnations. The use of nanoscale Cu instead of bulk Cu improves the durability of wood against microbial and fungal activity due to: (i) increased effective surface area of Cu, enhancing dispersion stability, (ii) ability to penetrate bordered pits; and (iii) decreased viscosity of formulations. The above properties contribute to easier impregnation and deeper and more homogeneous uptake of reactive biocide into the wood, which allows effective and continuous protection over time.

In contrast to the significant benefits from using Cu nanomaterials in timber preserving impregnations, there are considerable societal concerns regarding their environmental impacts and human health risks. The robust estimation of these impacts and risks requires understanding of what quantities and which forms of Cu are released and what are their environmental and health effects, which is information difficult to obtain due to the lack of methods to measure and characterize the release. In order to address these challenges the European projects SUN, NanoDEN and ECONANOSORB as well as the U.S. Environmental Protection Agency have investigated the environmental impacts and health risks of Cu nanomaterials used in timber preserving impregnations.

Objectives

The objective of the workshop is to meet experts from Europe, Russia and USA to discuss the results of the above projects on the topics of release, fate, exposure, effects, lifecycle impacts and health risks of the Cu nanomaterials, covering both experimental and modeling approaches.

Workshop agenda

08:30 – 09:00	**Arrival and registration**
09:00 – 09:10	Welcome & introduction to the workshop *Antonio Marcomini, University Ca' Foscari of Venice (Italy)*
Session 1: Release, fate, exposure and effects of nanoscale Copper used in timber preserving impregnations *Chair: Danail Hristozov, University Ca' Foscari of Venice (Italy)*	
09:10 – 09:30	Copper-based timber preserving formulations *Joerg Habicht, BASF (Germany)*
09:30 – 09:50	Copper nanoparticles for wood protection: Effectiveness and remobilisation in the air *Chiara Civardi, EMPA (Switzerland)*
09:50 – 10:10	Modeling $CuCO_3$ flows: Results from the NanoDEN project *Bernd Nowack, EMPA (Switzerland)*
10:10 – 10:30	Advanced treatment of wastewaters from heavy metals ions by aluminosilicates activated by electromagnetic fields *Maxim Anisimov, Voronezh State University (Russia)*
10:30 – 10:50	Hazard and risk assessment of Copper based nanomaterials *Janeck James Scott-Fordsmand, Aarhus University (Denmark)*
10:50 – 11:10	**Panel discussion**
11:10 – 11:30	**Coffee break**
Session 2: Lifecycle impacts of nanoscale Copper used in timber preserving impregnations *Chair: Michael Tsang, University of Bordeaux (France)*	
11:30 – 11:50	Certification of a micronized copper wood preservative (MCA) as Environmentally Preferable, based on Life Cycle Assessment *Keith Killpack, Koppers Performance Chemicals, SCS Global Services (USA)*
11:50 – 12:10	Lifecycle Analysis of MCQ-treated lumber products *Michael Tsang, University of Bordeaux (France)*
12:10 – 12:30	Environmental impacts of nano and non-nano copper based wood preservatives systems *Michael Steinfeldt, University of Bremen (Germany)*
12:30 – 12:50	**Panel discussion**
Invited speech	
12:50 – 13:10	Modification of polycondensation resins with mineral adsorbents for environmentally friendly wood products *Jan Sedliacik, University of Technology Zvolen (Slovakia)*
13:10 – 14:00	**Lunch**
14:00 – 16:00	*Breakout sessions:* • *Formulating nano Copper release and exposure scenarios for different lifecycle stages (Moderator: Lisa Pizzol)* • *Nano Copper environmental fate, effects and risks (Moderator: Bernd Nowack)*
16:00 – 16:30	Break-out presentations and final discussion