



Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

Department of Soil and Environment

Independent project/degree project

Heteroaggregation of Gold Nanoparticles with Natural Soil Colloids

Credits: 30 credits

Level: Master

Subject: Soil Science/Environmental Science/Nano Science/Physical Chemistry

Start: From Oct 2017 or later

Background

The challenges associated with assessing the risks of the increased production and use of engineered nanoparticles (ENPs) have been widely discussed. The risk assessments should be based on transport models, predicting the transport of ENPs in the environment. Describing the transport of ENPs in soils is one crucial process which has to be included in the models.

Heteroaggregation of ENPs with natural colloids and organic matter are central processes affecting the transport of ENPs through soils. Therefore, fate descriptors for heteroaggregation have to be estimated for the systems and later included in the models.

Issues

Attachment efficiencies for heteroaggregation are required as input parameters in environmental fate models. No standard method/protocol for determining the attachment efficiencies is available at the moment. Therefore, an experimental method has to be developed to be able to obtain reliable values of the attachment efficiencies.

Performance

Aggregation of gold nanoparticles with natural soil colloids and organic matter will be studied using a Dynamic Light Scattering (DLS) technique and/or Nanoparticle Tracking Analysis (NTA). The experimental protocol has to be further developed and the results will be evaluated using a model based on the Smoluchowski equation.

Contact: Karin Norrfors and Geert Cornelis, Soil Chemistry, Department of Soil and Environment, SLU

Email: karin.norrfors@slu.se, geert.cornelis@slu.se

Phone: +46 (0) 761-33 39 67