proposal for a Master thesis in material science duration : 6 months

Research Proposal · July 2018

CITATIONS
0

READS
431

1 author:

Anne Boos
University of Strasbourg
53 PUBLICATIONS **450** CITATIONS

SEE PROFILE

Master 2 project 2018-2019: Development of a composite sorbent for heavy metal depollution

Supervisor: Anne BOOS (anne.boos@unistra.fr) / Caroline BERTAGNOLLI (caroline.bertagnolli@unistra.fr)

Laboratory: RePSeM team from IPHC (UMR 7178) - ECPM – 25 rue Becquerel – 67000 Strasbourg

Heavy metals are rejected by a large number of industries and contaminate water resources. These pollutants present serious risks to wildlife and lead to health problems. Furthermore, regulations become even more severe on maximum accepted concentration levels on wastewater. This project aims to contribute to the sustainable management of natural resources through the development a new composite material to use on sorption continuous process and to recover efficiently toxic metals. The hybrid material will be composed of silica grafted by biomolecules, previously developed in our laboratory. These fine particles of the efficient silica sorbent must be immobilized in a gel matrix to avoid pressure drops and clogging effect, especially in fixed-bed column systems (normally used for industrial applications). Natural-based and biodegradable polysaccharides, such as alginate and gellan gum will be used, aiming at the development of sustainable and environmental-friendly immobilization matrices. The properties of polysaccharide particles containing immobilized silica, such as size, shape and internal structure can be controlled by the composition and processing conditions employed to produce the particles. Thus, in order to achieve the best immobilization, sorption and recovery of the pollutants, the processing conditions, such as polysaccharide concentration, pH, ionic strength, among others will be evaluated. Tests on fixed-bed column will be performed in order to determine the resistance of immobilized bio-functionalized silica to continuous flow, by changing flow velocity and analyzing particles collapse and transport.

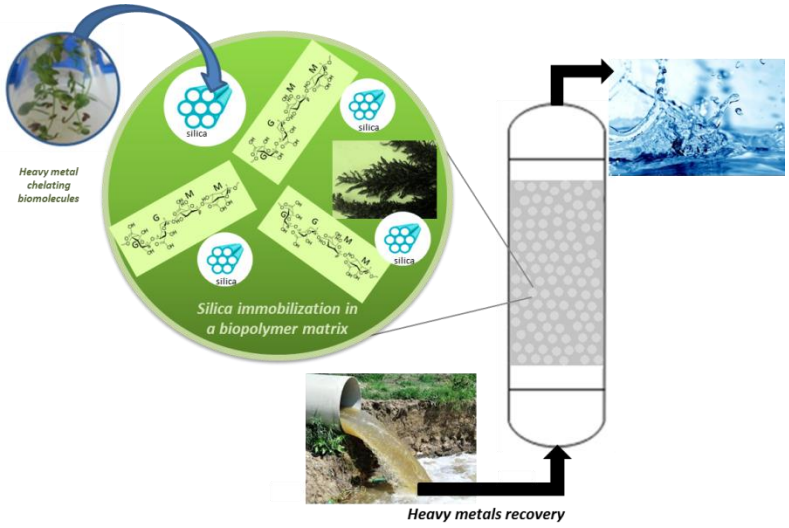

Fig. 1 - Work strategy

The student will use different characterization techniques (electronic microscopy, N_2 porosimetry, IR spectrometry …) and elemental analysis techniques (CHNS microanalysis, ICP-AES, ICP-MS) to describe the composite materials and their adsorption properties.