

Title: Functionalization of magnetic and metallic surfaces for environmental applications

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Contamination of natural water for oil spill and heavy metals have become an important problem for the last years. Many of the methods that have been used are not sustainable. Therefore, it is necessary to develop a method for removing this contamination of water by using eco-friendly compounds and systems.

The aim of this project is to make a functionalization of iron in order to remove different oils and heavy metals from water. Functionalization of surface iron with lauric acid is going to produce superhydrophobic and also superoleophilic behavior of these metal particles in water. These properties will allow possibly adsorb oil and not water. Before of making the chemical etching of iron, it was processed with a top-down method in order to have the smallest iron particle size. Ball milling to reduce the particle size. Different time of milling with the same process parameters were selected. Then the samples were characterized in Field Emission Scanning Electron Microscope (FE-SEM) and Energy Dispersive Spectroscopy (EDS). The iron with the smallest particle size is functionalized with lauric acid and it is characterized by X-ray photoelectron spectroscopy (XPS) and Raman spectroscopy. It is also analyzed the metals remove with technic Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES).

Keywords: Superhydrophobic and superoleophilic properties, sustainable methods, oil/water separation, heavy metals, surface functionalization.