

13th International Conference on

NANOTEK & EXPO

December 05-07, 2016 Phoenix, USA

Enhancing fast settling of oil emulsions in wastewater by in situ production of iron based nanoparticles

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Oil emulsions in wastewater treatment represent a challenging issue faced by several industries in order to achieve the environmental regulations with a minim operational cost. Oil and gas, automotive and food industries are the main ones which require cost effective processes for oily wastewater. Oil emulsions are hard to be separated especially due to surfactants interactions. Employing a nanotechnology approach, a pilot plant has been constructed in an automotive industry facility in Mexico for wastewater treatment. The process consists in the in situ iron based nanocrystals which inactivate the interactions of the surfactant between oil and water. As a consequence, a fast settling occurs. Serial separation unit operations such as settling, filtration, adsorption and microfiltration achieves a total remove of suspended solids, color and odor of the water. The constructed pilot plant allows to keep recycling the 80% of the water during engine washing processes. The produced nanoparticles were characterized by XRD, FTIR and textural properties were analyzed by BET. The crystal domain size of the particle could vary between 5 to 20 nm and it can be modified by the operation of the automatized system. Softening of the water was also reported during the physicochemical process.

Biography

Jose Humberto Ramirez is current student of master in Chemical Engineering and research assistant in the Dr. Nassar Group for Nanotechnology Research at University of Calgary (Canada). He is a recognized speaker in Mexico, CEO of the Mexican company TECAM (Environmental Technologies of Mexico) and Director of Projects of the company Cplanta. Both of them are recognized companies related to wastewater treatment by the application of Nano and biotechnology. He has been recognized by the President of Mexico in 2016 due to his contributions to the care of environment.

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