J Material Sci Eng 2016, 5:7 (Suppl)
http://dx.doi.org/10.4172/2169-0022.C1.047

6th International Conference and Exhibition on
Materials Science and Engineering
September 12-14, 2016 Atlanta, USA

Demulsification of water-in-oil emulsion by a novel nano-titania modified chemical demulsifier

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The exploration and production of crude oil are often accompanied by water in oil emulsion (W/O) formation that can pose serious problems for downstream refinery industries. Chemical demulsification and electrostatic separation are two major techniques that are commonly used to overcome the problems associated with the formation of W/O emulsions. In this study, nano-technology was employed to facilitate the demulsification process and titania was chosen as a case study. The prepared samples were dispersed in a conventional chemical demulsifier to verify whether it can improve the separation process. The prepared nano-titania particles were analyzed by particle size analysis (PSA), X-ray diffraction (XRD), transmission electron microscopy (TEM), bottle test, electrostatic test, and standard IP77 method. The results specified the sample with the highest water separation performance and obviously revealed that it would effectively increase the demulsification efficiency to a value greater than 90% and it would also decrease the settling time required for efficientseparation.

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Conversion of waste plastic into liquid hydrocarbon fuel

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Waste Plastic is huge problem in USA and around the Global. This is global problem. Inventions of the twentieth century, plastics are everywhere. Society has found ample ways to use plastics. But users are less adept at managing the material when they are finished with it—often after only one use. The volume of plastics being produced, used, generated, and discarded is greater than ever before. Plastics therefore require increasing effort and ingenuity to properly manage. Annually, of the 120 billion pounds of plastics produced in the United States only about 6% or 4.8 billion pounds are recycled. For all the talk of plastic bags, plastic production is increasing. Waste Technologies LLC (WTL) has the solution at its disposal. This technology can produce approximately 1.3 liter of "WTL fuel" from one kilogram of plastic waste. The exact yield depends on the type of plastic, and the grade of WTL fuel desired. Typically, the process produces a residue of less than 5% of the weight of the plastic waste. This residue is rich in carbon and may be an environmentally superior substitute for coal with a higher BTU value. The WTL technology is able to cater to a wide range of diverse applications, including but not limited to fuel, gas and electrical generation. NSR's / WTL patented technology, in conjunction with WTL technology and know-how, is a simple and economically viable process to decompose the hydrocarbon polymers of waste plastic into the shorter chain hydrocarbons of liquid fuel. WTL believes that it can convert approximately one tonne of plastic into about 300 gallons of fuel at a cost of about $0.75-$1.00 per gallon and produces 4,205 ft3 (CFT) of light gas (C1-C4) byproduct when developed to commercial size. WTL's refining process is uncomplicated and promises to be very competitive with large crude oil installations. In financial projections WTL uses $30/bbl. ($0.71 per gallon) for preprocessing and refining costs. Other plastic recycling technologies generally have a very narrow band of plastics they can use. Nearly all recycling is done with plastic designations 1 or 2 while designations 3 through 7 are virtually untapped (over 70% of all plastic fall within these categories). A combination of economic and technological factors account for this situation. The advantage of WTL technology is that it can produce a profitable product from material that society generally pays to thrown away. It is this no or low cost feedstock that is the key advantage.

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