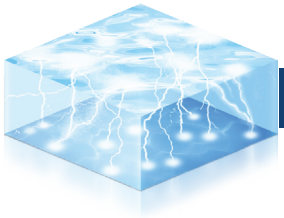


WHITE PAPER

Electro Water Separation

A modified electro-coagulation-flotation system has been developed for removal of Total Suspended Solids (TSS) and non-soluble organics such as algae, biological material and oil from water.

Abstract

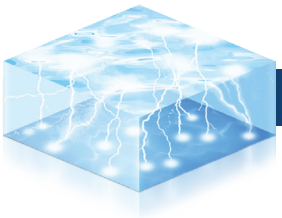
A modified electro-coagulation-flotation system has been developed for removal of Total Suspended Solids (TSS) and non-soluble organics such as algae, biological material and oil from water. In this approach, catalytic reactions are generated to reduce the amount of Al or other donating anodes ions in both phases of the process by substituting 50%-75% of donating anodes with catalyzing anodes. These Titanium based anodes are coated with a blend of multiple metal oxides derived from noble metals and are interspersed within the process flow at strategic points to affect the Al ionized water through the generation of a surfeit of gases which in turn accelerate the electro-chemical processes of coagulation and flotation. This method increases volumetric handling of waters with a lowered consumption of energy. Further to the process is the aerobic conditions and chlorination generated within the water column to affect bacteriological contamination.

Introduction

The basic technology of electro-coagulation and flotation has been utilized for a number of years to good effect in a number of small scale or low flow environments. Scale deployment in large flows or in extreme environments where continuous usage tears away at donating anodes forcing excessive maintenance and replacement has precluded economic viability.

Usages

OriginClear has successfully proven that by substituting a percentage (up to 75%) of donating anodes with catalyzing MMO's anodes, we can reduce the amount of donating anodes in electro-coagulation and flotation of Total Suspended Solids (TSS) and non-soluble organics such as algae, biological material and oil from water.



The design, which consists of specific contact area between anode and cathode at the coagulation step and a combination of plates and tubes in the flotation area is important, but it is the compound activity of both interactive zones that appears to produce the products we are obtaining in the field. This indicates that a catalyst reaction might be occurring as evidenced by the reduction of donating ions usually required for the task. An additional advantage of this system is the sanitation of the material through either a chlorination or extreme aerobic condition created by the use of these catalysts.

The primary application for this technology is in the handling of hydrocarbon polluted waters such as oil well (EOR), fracking, ballast waters and industrial discharges. However, the discovery has far-reaching implications for all types of pollutants in waste water as well as dewatering of non soluble organics from water columns such as algae or vegetal waste from hydroponic systems.

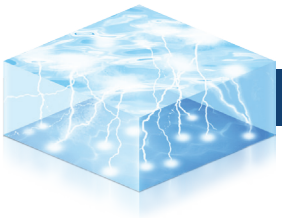
Brief Description of the Technology

The primary step of the electro-coagulation step is aggregating or coalescence of the organics in solution so as to increase the particle size within the fluid to better affect flotation.

The flow of the water is brought to a vortexial phase by specific pipe dynamics forcing material in water to thoroughly blend and break up into smaller clusters. This reduction in particulate size increases the contact zone between the material and donating anodes and then through a sequence of catalytic anodes reforms into large agglomerates. The ratio of Al to MMO is roughly 50%.

The product is disgorged into a lower pressure zone where the product of the coagulation step is flocculated by a curtain of hydrogen and oxygen bubbles generated by a blend of 25% Al anodes and 75% MMO. The pollutant is recovered by standard rake and beach utility such as is used in the DAF industry. The clean water is drawn off for further handling through media filtration and Ultra-Filtration or other membrane technology such as R/O. It is the goal of the process to remove organic material and sanitize the water to lower the load on filters and thereby increase their efficiencies. It is understood that in a closed environment, proper care would assure that any gases generated by the process would be safely evacuated or even captured for alternate uses by flume hoods.

1. A working theory is that passing the bulk material through the relatively high pressure conduit, decreasing particle size which in turn temporarily decreases van der Waals force between molecules actually engenders coagulating of like to like molecules and enhances flocculent or ionic contact in the flow sequence of the tubes.



We have successfully demonstrated a 10,000 barrel per day system for process frack water in Colorado. It is available for viewing and testing anytime.

Materials

Multiple Metal Oxides anodes have been used for decades in the production of Chlorine and Oxygen. They are readily available in a number of formats, such as tubes, plates and screens. Furthermore, the use of Titanium substrates onto which Oxides such as Iridium or Ruthenium are synthesized as coatings make these otherwise rare metals affordable and long lasting. It is the design of the system to have a long life with occasional changes in the Aluminum anodes as a simple maintenance activity rather than a continual problem as they are now used at low power to donate a minimum of Al ions to the system.

Conclusion

We have successfully demonstrated a 10,000 barrel per day system for processing frack water in Colorado. It is available for viewing and testing anytime. Our licensees current plans include building a modular unit that could handle up to 20,000 barrels per day in a containerized module with an efficiency rate of 99% removal of suspended organics such as oil or other organic matter.

We have also proven that the UF system was made more effective by having our system handle the heavy lifting and reduce the bacterial load without the use of Ozone or UV.

This system has numerous patent filings and approvals in the US, China, Japan and Australia.

This primer was written to introduce the OriginClear system. We can supply all collateral data on performance characteristics, videos and blueprints.

CONTACT US

5645 W. Adams Blvd.
Los Angeles, CA 90016

Toll Free: +1 877-999-6645
Email: sales@originclear.com

www.OriginClear.com