



'Shamantra' Overview

Molecular Mediation ("MM") has developed a range of **revolutionary products which have never before existed for problems which have never before been solved.**

Pollution – e.g., Oil Spills, Heavy Metal Contamination



The first set of MM **'Shamantra'** products provides a complete solution for the capture and removal of air, ground, and water pollution, as well as contamination caused by industry. The most common forms include polychlorinated biphenyls (PCBs), heavy metals, radionuclides, hydrocarbon oils, and 'greenhouse' gasses emitted when carbon and hydrocarbon materials are burnt or combusted.



CO₂ Capture & Sequestration

'*Anthropogenic Climate Change*' is the subject of virtually daily news coverage in which CO₂ emissions are blamed. Billions of dollars have been spent and billions more will be raised to find a viable and cost effective solution capable of capturing and storing ('sequestering') carbon dioxide. The MM product **Shamantra Green** now renders this quest redundant, and all funds invested into such projects wasted.

Not only will **Shamantra Green** sequester carbon dioxide at a very small fraction of the cost of any proposed or theoretical method suggested to date, **it will convert it into pure carbon and oxygen, thereby eliminating carbon dioxide completely!**

MM products are marketed under the generic name **Shamantra**. These products perform *sorption* (absorption, adsorption), converting a pollutant into benign or beneficial organic compounds by natural biodegradation. MM products are available in a powder form that may be used as media in air filtration systems to absorb gas emissions. They can also be applied directly to oil and toxic spills on land or in water. CO₂ and greenhouse gasses can be captured and converted within weeks; oil spills can be completely remediated in a matter of months instead of decades.

Shamantra is both hydrophobic (i.e. *tending to repel and not absorb water*) and oleophilic (i.e. *having a strong affinity for oils rather than water*), exhibiting extraordinary propensity to sorb and convert hydrocarbon gasses, oils, and other contaminants, at a sorption ratio of up to 30:1. (The sorbed contaminants agglomerate and are broken down by natural biodegradation.)

Shamantra: Examples of Comparative Functionality

Shamantra breaks carbon and hydrocarbon gasses down into pure carbon and oxygen. Similarly, *Shamantra* breaks down hydrocarbon oils (crude oil) into smaller organic molecules such as fatty acids, amino acids and sugars, which become part of the natural food chain. Once sorbed into *Shamantra*, the contaminants will not leach, even if placed under pressure.

Shamantra Green absorbs, adsorbs, breaks down, and converts hydrocarbon oils and gasses into benign organic compounds. *Shamantra Green* captures carbon dioxide (CO₂) and carbon monoxide (CO) within its matrix, and converts it to pure carbon and oxygen within weeks. CO₂ or CO will not leach from the media matrix at any time, even if placed under pressure. The result is a valuable carbon and oxygen rich organic fertiliser, which can be recovered and utilised as a separate product.

Shamantra Blue is the name of the water remediation product. It can be applied directly to oil spills in water, with no need for subsequent removal and disposal. It sorbs and breaks oil down into sugars, fatty acids, and amino acids, which are basic plant food. In warm water environments, complete remediation requires as little as 6 weeks; in colder environments it will take longer, but generally remediation completes within months.

Depleted Land Restoration & Health Industry Applications

By varying the processing parameters of the *DevourX* technology, and the organic raw material, a new product has been created that yields extraordinary amounts of humic substances. Humic substances are the primary active components of the products engineered by *Molecular Mediation* for the agriculture and health industries, and are branded as "*Humanic*".

MM products are 100% organic, that is, completely natural, non-chemical, non-toxic, and non-harmful. They are unique because they are synthesised by a new proprietary, patent-pending technology, and they are revolutionary because they deliver exceptional results never before possible on such a large scale.

The value of our products is immeasurable. **They have the ability to remove and/or remediate most of the pollution and contamination throughout the world today.**

How is it created?

Molecular Mediation produces *Shamantra*, by subjecting organic lignite and organic catalysts to a unique process. The *DevourX* process [www.devourx.com] is a patent-pending technology to process material by a technique known as "*Aeroacoustics*", which combines aerodynamics, pressure, vacuum, and sound waves, altering the original molecular structure of material.

This molecular alteration is a purely mechanical function with no dependence on chemicals, toxic materials, or any dangerous catalysts or modification agents and, most importantly, **no heat to destroy the microbial life within the base materials.** It is achieved by removing moisture from the material and subsequent exposure of the organic compounds (within the substrate of the material) to an oxygen and hydrogen rich atmosphere. **The process creates voids in the substrate to which the target contaminant is attracted and sorbed.**

The ability of the altered material to sorb various pollutants is radically increased by the process. The cost to process material by this method is quite economical. **It should be noted that there is no other technique or technology presently known that can either achieve such outcomes or increase the value of the base materials so significantly.**

Shamantra: Examples of Comparative Functionality

Applications

In practical terms, all the poisonous/toxic gas emissions from power stations, the broader energy industry, and other sources of pollution can be filtered through **Shamantra**, converted into benign or beneficial matter, and put safely back into the ground. PCBs, heavy metals, and radionuclide contamination can be safely converted into benign organic compounds and put safely back into the ground with no negative impact on the environment.

For the very first time **"Ground-to-Ground Recycling"** will become a reality. **Whatever is taken from the ground and turned into pollution can be captured and put safely back into the ground, either as high-quality fertiliser or as bio-available plant nutrients.**

Official Recognition

The intellectual property, know-how, trade secrets, and trademarks relating to the business are robust and have undergone scientific scrutiny. **Shamantra** has been tested extensively and approved by regulatory authorities, including the *US Environmental Protection Agency* (US EPA). Independent testing by certified laboratories has confirmed that the efficacy of **Shamantra** is far superior to any product currently available. The manufacturing technology is proven, and production capacity can be increased by millions of tonnes per year within six months of equipment order.

Worldwide Applications

A massive potential for use worldwide exists for products and solutions, such as **Shamantra**, that can clean-up, remedy, improve, treat, sequester, remove, convert, and/or eliminate air, ground, and water pollution, and contamination caused by industry.

The products have applications in numerous industries including Agriculture, Power, Oil & Gas, Military, Pollution Control, and Health. It is likely that demand will exceed supply for the foreseeable future.

An equally massive worldwide market exists for **Humanic** products that can replenish depleted soils and farmland, and restore minerals and nutritional substances, which have been depleted by decades of negligent farming methods and contamination such as the overuse of fertilisers and pesticides.



Shamantra: Examples of Comparative Functionality

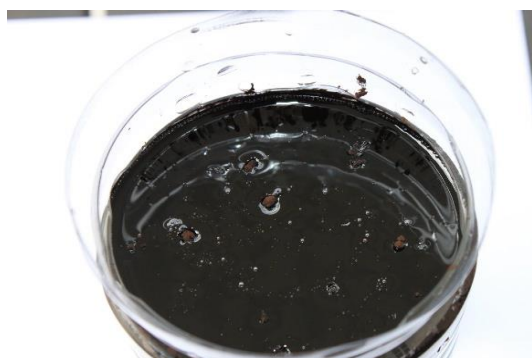
Product	Removes Metals	Removes Oxo-Anions	Removes Organics	Removes Radionuclides	Cost of Treatment
Activated Carbon	No Effect	No Effect	Adsorbs onto carbon surface. No bio-remediation effect.	No Effect	Low
Anion Exchange Resin	No Effect	Ions are exchanged and bound as a salt to the resin. Resins are selected according to the metals to be removed. Needs frequent regeneration	No Effect	No Effect	Medium-High
Cation Exchange	Ions are exchanged and bound as a salt to the resin. Resins are selected according to the metals to be removed. Needs frequent regeneration	No Effect	No Effect	Ions are exchanged and bound as a salt to the resin. Resins are selected according to the metals to be removed and needs frequent regeneration	Medium-High
Chemical Precipitation	Compounds are added to the water that chemically react with the contaminate. The products of the reaction will then either sink to the bottom or float to the top of the holding tank, then are removed and require disposal	No Effect	No Effect	Compounds are added to water that chemically react with the contaminate. The products of the reaction will then either sink to the bottom or float to the top of the holding tank, then are removed and require disposal	Medium
Polymer Filtration	Selected polymers chemically bind with the targeted metal ions and form larger compounds. The waste stream is then forced through an ultra-fine filtration membrane, retaining the larger polymer-metal ion combination which are then removed and require disposal	No Effect	No Effect	Selected polymers chemically bind with the targeted radionuclide ions and form larger compounds. The waste stream is then forced through an ultra-fine filtration membrane, retaining the larger polymer-metal ion combination which are then removed and require disposal	Medium
Modified Zeolite	Treatment of natural zeolites with cationic surfactants dramatically alters their surface chemistry. Modification of zeolites enables them to sorb neutral molecules such as benzene and Chlorinated hydrocarbons whilst retaining their ability to sorb heavy metal cations. Needs to be regenerated	No Effect	Treatment of natural zeolites with cationic surfactants dramatically alters their surface chemistry. Modification of zeolites enables them to sorb neutral molecules such as benzene and Chlorinated hydrocarbons whilst retaining their ability to sorb heavy metal cations. Needs to be regenerated	No Effect	High

Shamantra: Examples of Comparative Functionality

Product	Removes Metals	Removes Oxo-Anions	Removes Organics	Removes Radionuclides	Cost of Treatment
<i>Shamantra</i>	Reduces metal species and then chelates them – does not leach. Can be regenerated, disposed of non-hazardously or combusted with contaminants retained in the ash	Reduces Oxo-Anions and then chelates them – does not leach. Can be regenerated, disposed of non-hazardously in most cases or combusted with contaminants retained in the ash	Adsorption onto the carbon matrix and then bio-remediates and degrades the organics. Non-hazardous disposal	Reduces to form organo-metal complexes of improved adsorptive stability and solubility. Does not leach. Can be regenerated, disposed of or combusted with contaminants retained in the ash	Low

Regeneration refers to the necessity for further treatment such as, by heat, chemical treatment, washing in filter bags and other treatments, all of which require further disposal by other means.

Laboratory Test of *Shamantra*



Shamantra added to oil and water - became homogenous with oil.



Spherical-shaped balls sank to the bottom of the vessel.



There was virtually no oil visible on the surface, it had been absorbed and encapsulated by *Shamantra*, and the agglomerated particles then sank to the bottom of the vessel.



Samples of the agglomerated *Shamantra*/oil were examined physically. They were firmly bonded but crumbled when broken, and they did not leach oil when under pressure.

*Now, just imagine what **Shamantra** could do with an oil spill, such as the recent major disaster in the Gulf of Mexico!*