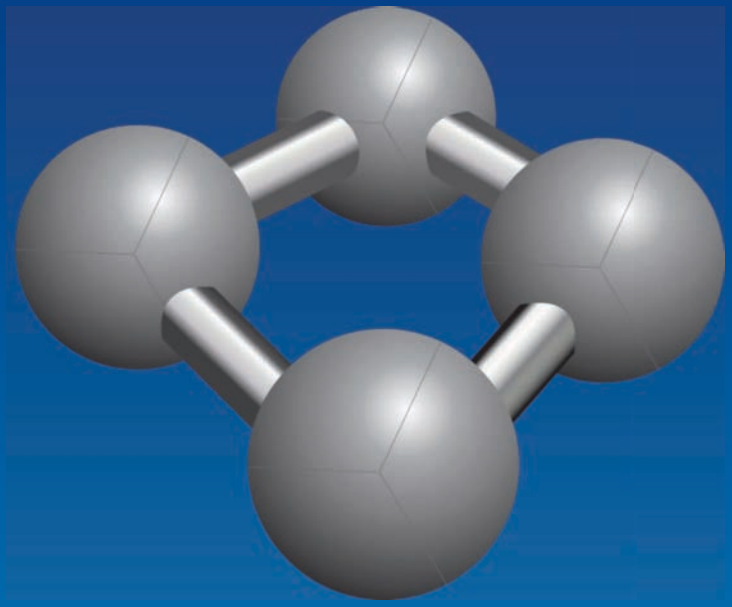
BIO-ORGANIC CATALYST

THE POWER IN NATURE®



Bio-Organic Catalyst Presentation

Overview

- Breakthrough technology for the water chemistry and waste treatment industries.
- Concentrated bio-organic catalysts in liquid formulations.
- Powerful solutions for improving the management of water systems and wastewater facilities.
- Strong economic and performance attributes over traditional chemicals, or enzyme based products.
- Utilized by clients world-wide in identified market sectors.

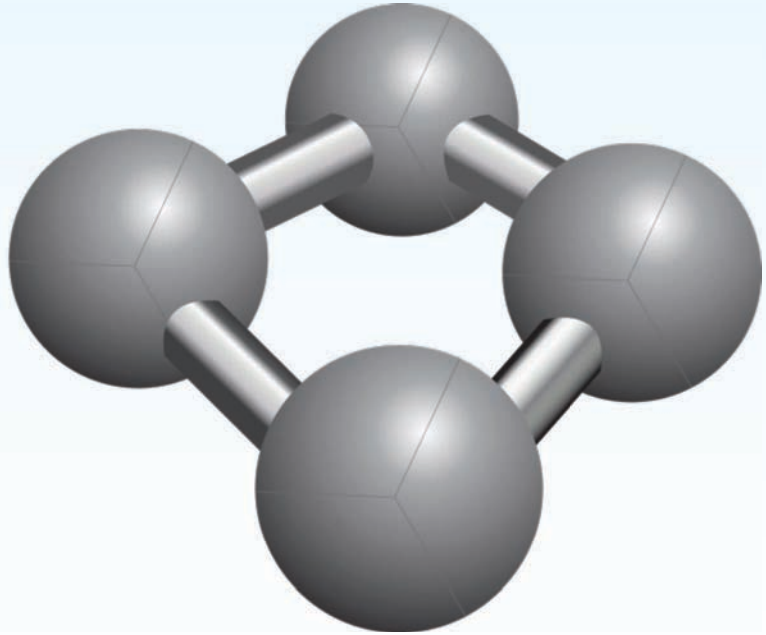
Product Overview

- **Aqua-Cat™**
  Advanced Bio-Catalytic Water Treatment.
- **Eccomate®**
  Municipal & Industrial Odor Control.
- **EcoCat®**
  Advanced Bio-Catalytic Treatment of Solid Wastes & Sewers.
- **EcoSystem Plus®**
  Optimization of Wastewater Treatment Processes.
- **Fiber-Cat™**
  Advanced Bio-Catalytic Treatment in the Papermaking.
- **NONTOX®**
  Bio-Catalytic Hydrocarbon Cleaning & Remediation.
- **Phyto-C3™**
  Water/Soil Conditioner.

Four properties that makes a Bio-Organic Catalyst work:

Biologically derived catalyst

Supplements for a healthier bacterial metabolism



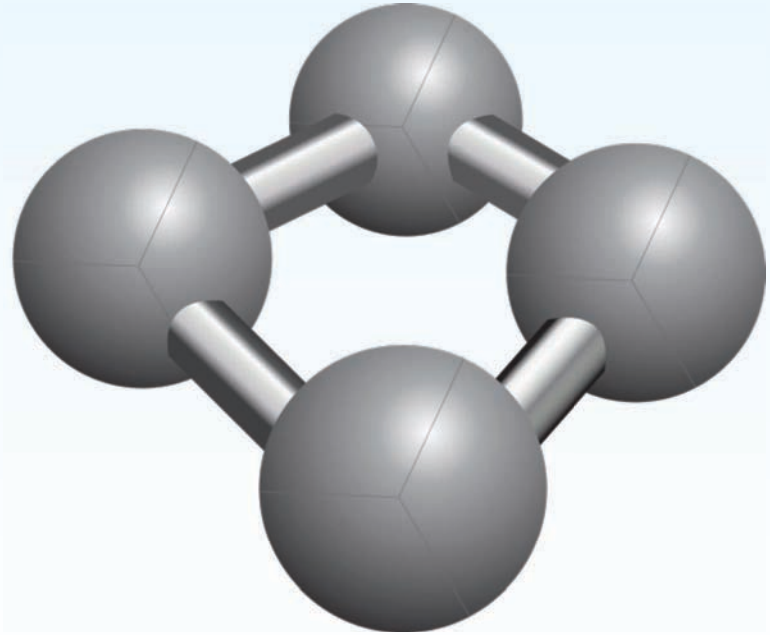
Surface modifying compounds

Carbon activation platform

Four mechanisms of a Bio-Organic Catalyst:

Solubilizing organic matter

Vitamins and minerals

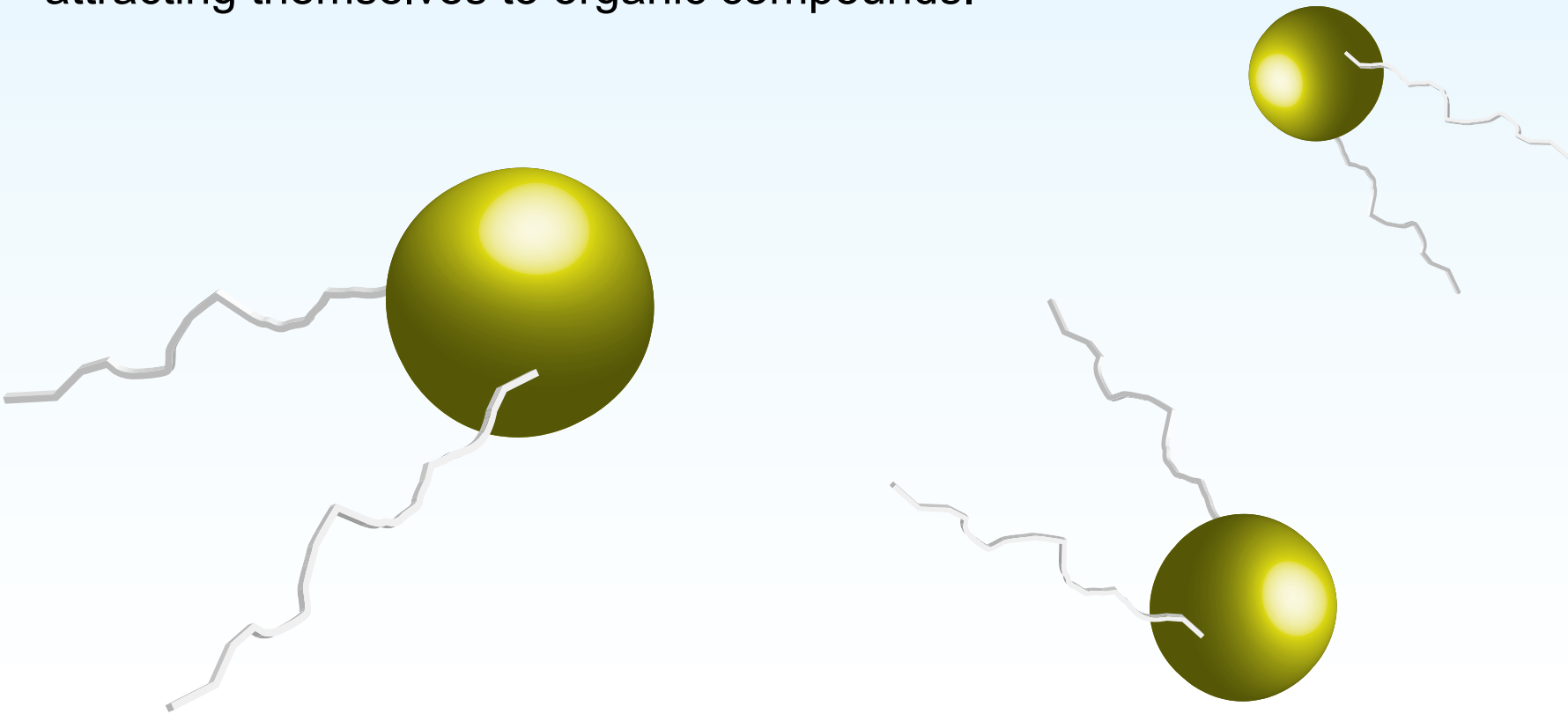


Increasing Dissolved Oxygen

Aggregation mechanism

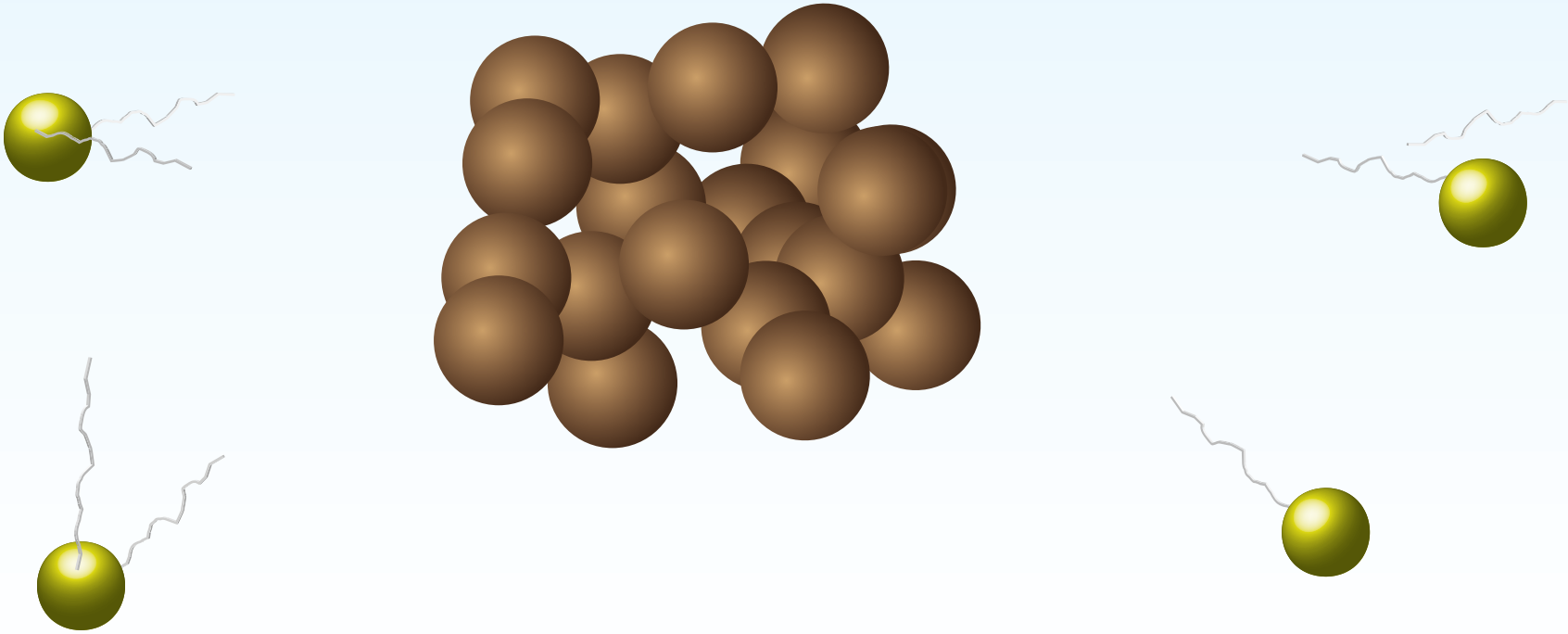
Demonstration of how a Bio-Organic Catalyst product works:

Bio-Organic Catalyst concentrates form very fine micro-bubbles with their amphiphilic components that are negatively charged, attracting themselves to organic compounds.



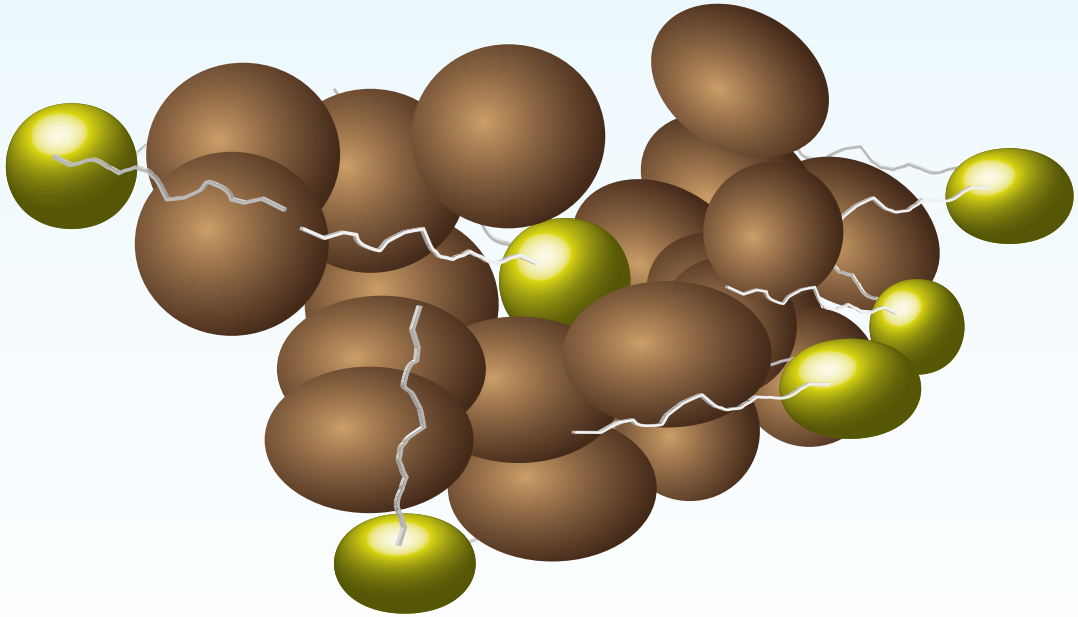
Demonstration of how a Bio-Organic Catalyst product works:

Bio-Organic Catalyst fine micro-bubbles will attach themselves to organic matter, and through their greatly enhanced gas transfer mechanism, initiate a rapid solubilization process ('bio-catalysis').



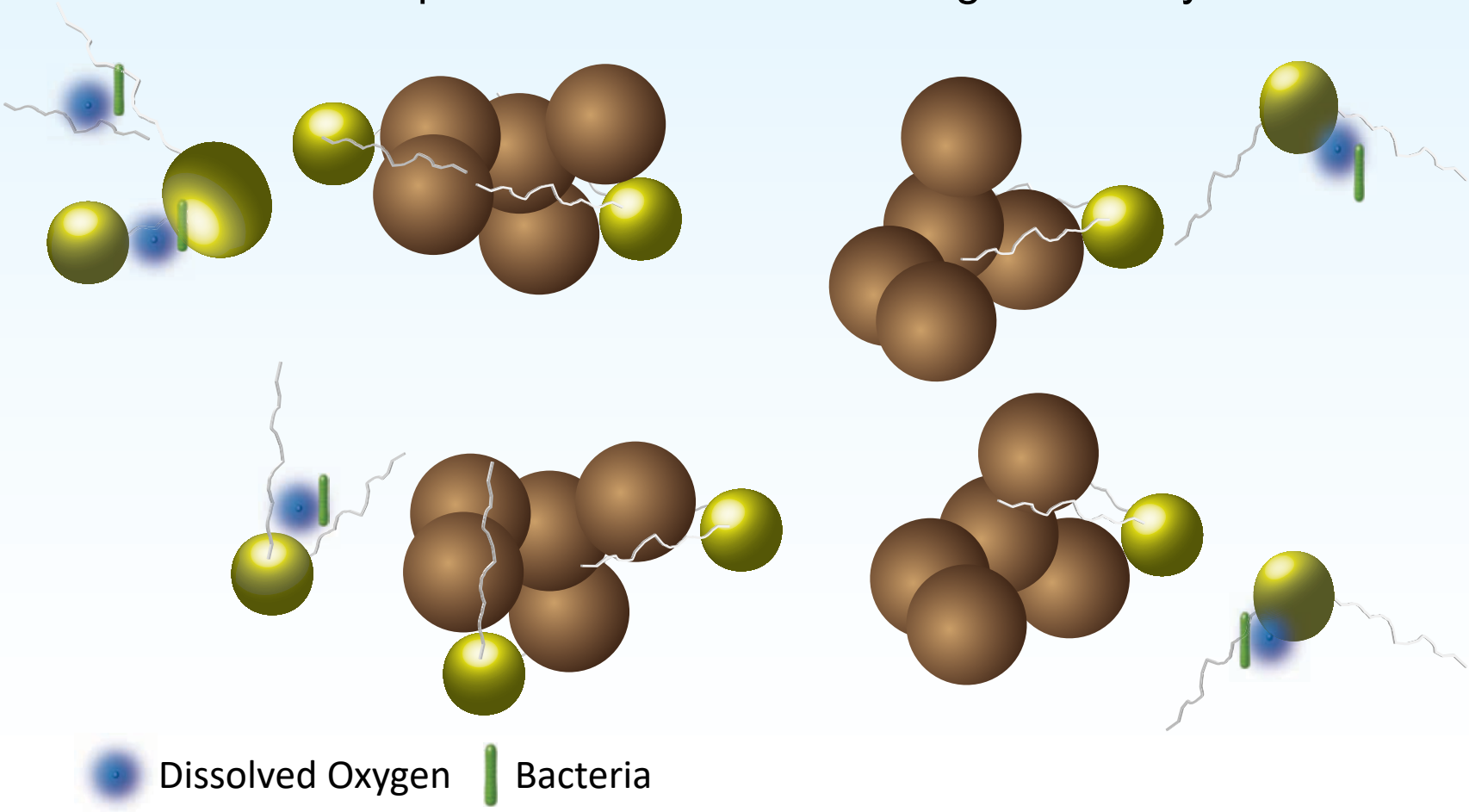
Demonstration of how a Bio-Organic Catalyst product works:

The organic contaminate molecular structure is quickly catalytically breaking down the molecular bonds, rendering the larger molecular structure into smaller, more biologically consumable parts.



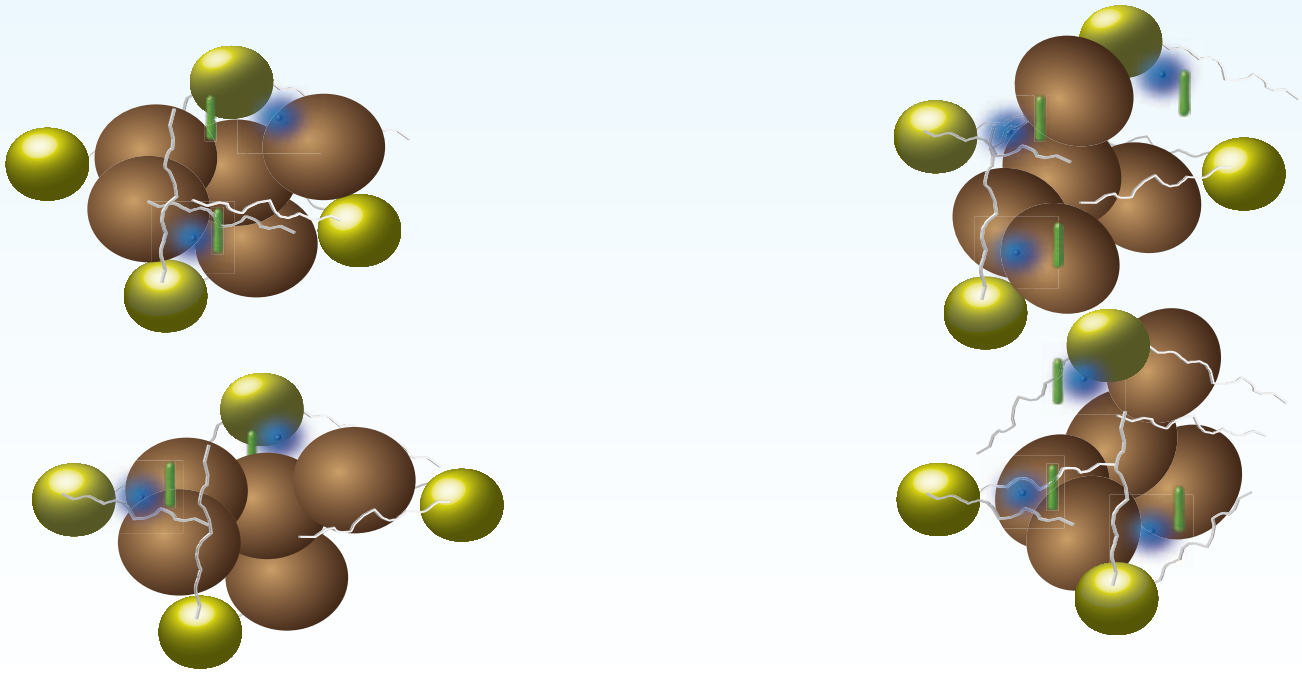
Demonstration of how a Bio-Organic Catalyst product works:

The Bio-Organic Catalyst liquid concentrate will self organize all the elements required for accelerated biological activity.



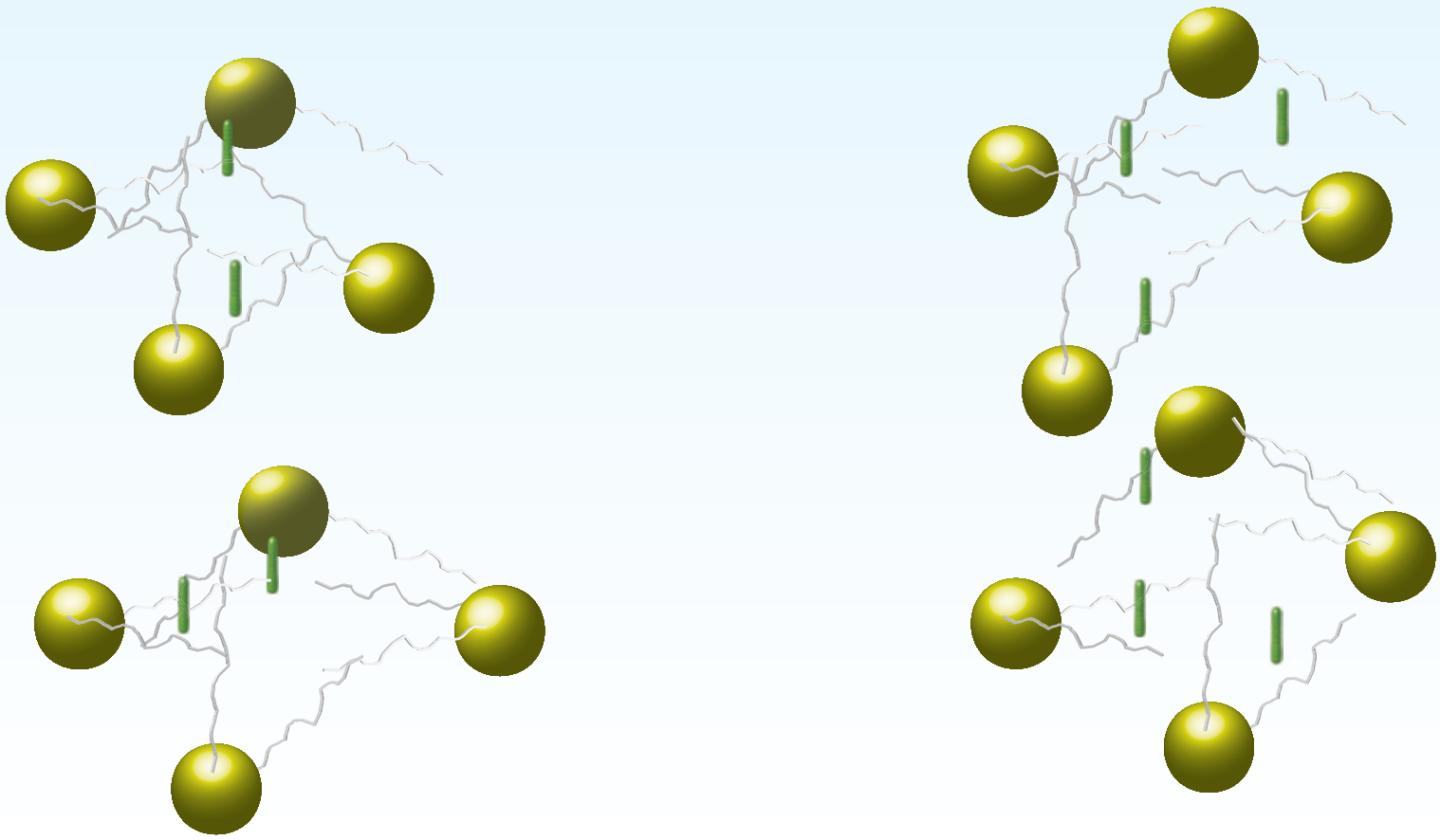
Demonstration of how a Bio-Organic Catalyst product works:

Throughout the water column, or entire biomass, there is a highly accelerated reduction of the organic contaminates, as all the necessary components are brought together.



Demonstration of how a
Bio-Organic Catalyst product works:

The aggregates then break apart, and the process starts again.



Benefits of Bio-Organic Catalyst products:

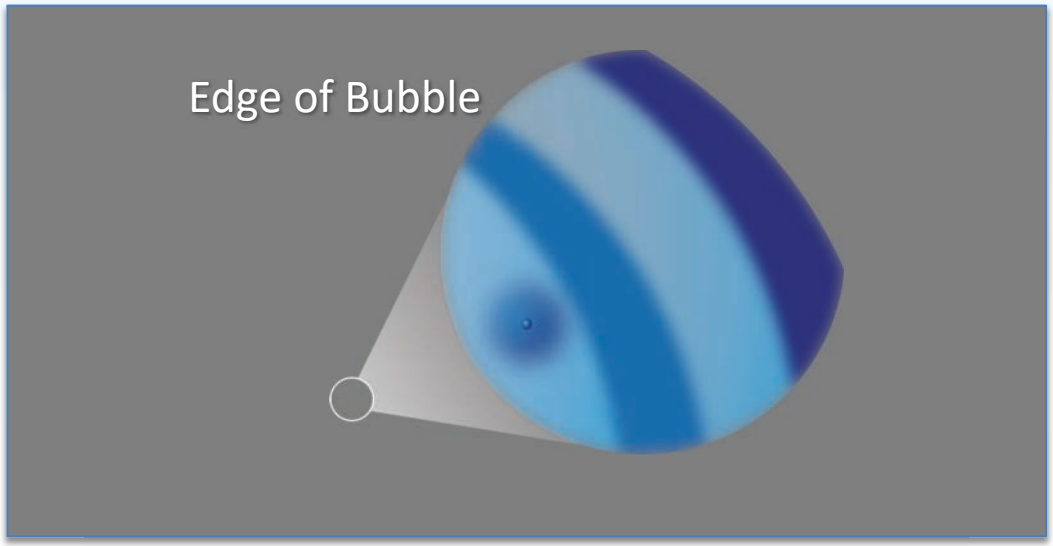
- Extremely Safe (Non-Irritating)
- Non-Toxic (To Bio-Aquatic Species)
- 100% Biodegradable
- No live organisms (bacteria and enzyme free)
- Accelerates both chemical and biological reactions
- Increases oxygen transfer rates
- Improves the loading capacity of wastewater systems
- Reduces BOD, COD, TSS, TKN
- Improves aeration energy requirements
- Odor control
- Reduces sludge and biosolids
- Reduces system maintenance

The Bio-Organic Catalyst fine micro-bubble:

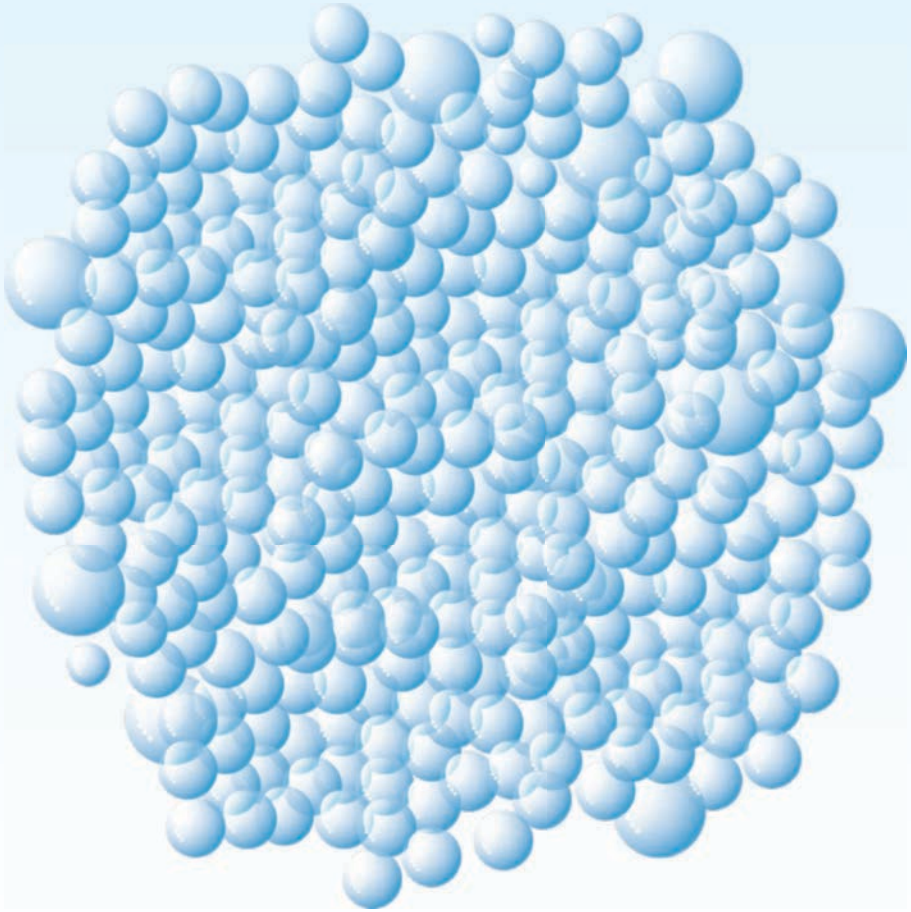
- Aids in the diffusion of oxygen into the water column
- Increases the available dissolved oxygen (+DO)
- Provides higher dissolved oxygen for more rapid biological oxidation
- Provides dissolved oxygen for chemical oxidation reactions
- Shifts the bulk water column to a more aerobic state
- Attaches to insoluble waste components, increasing solubility
- Dissolves the molecular structure of biofilms and organic glues
- Disperses throughout the entire water column

Oxygen transfer takes longer in larger bubbles, why?

1. The air bubble rises very fast so ‘Gas Hold Up’ time is limited.
2. First the Oxygen must move through the bubble.
3. Then it must cross through the film holding the bubble together.
4. Then it travels through a dense boundary layers surrounding the bubble.

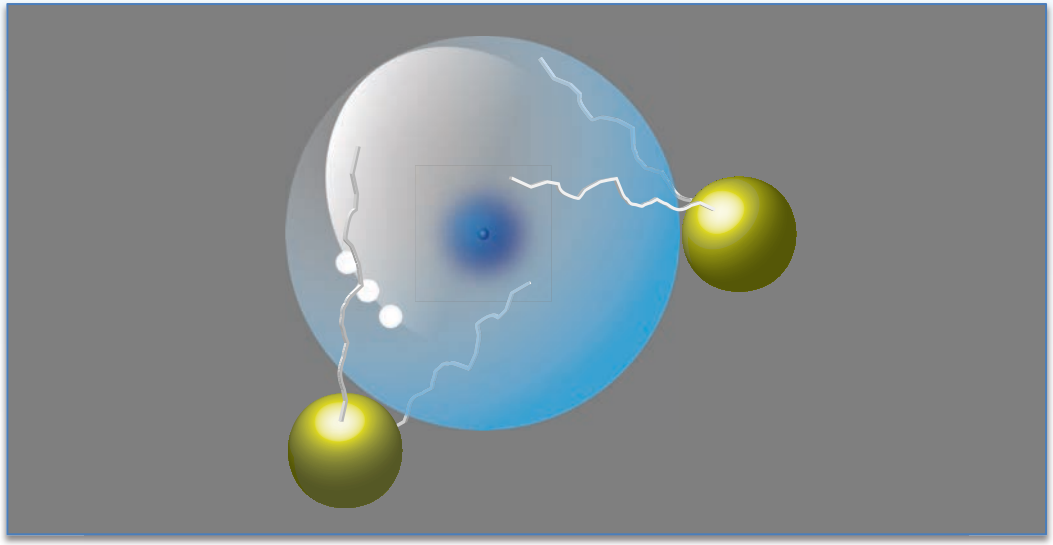


Whereas Bio-Organic Catalyst liquid concentrates create **very fine micro-bubbles**



The Bio-Organic Catalyst very fine micro-bubble encourages a rapid oxygen transfer to both the water column, and into organic wastes:

- First, the distance from the center to the surface of the microbubble is much shorter.
- Next, the surface is not a rigid film but a loose structure that the oxygen can pass through easily.
- Once outside, other BOCs help guide the oxygen to the bacteria and begin the self organizing process.



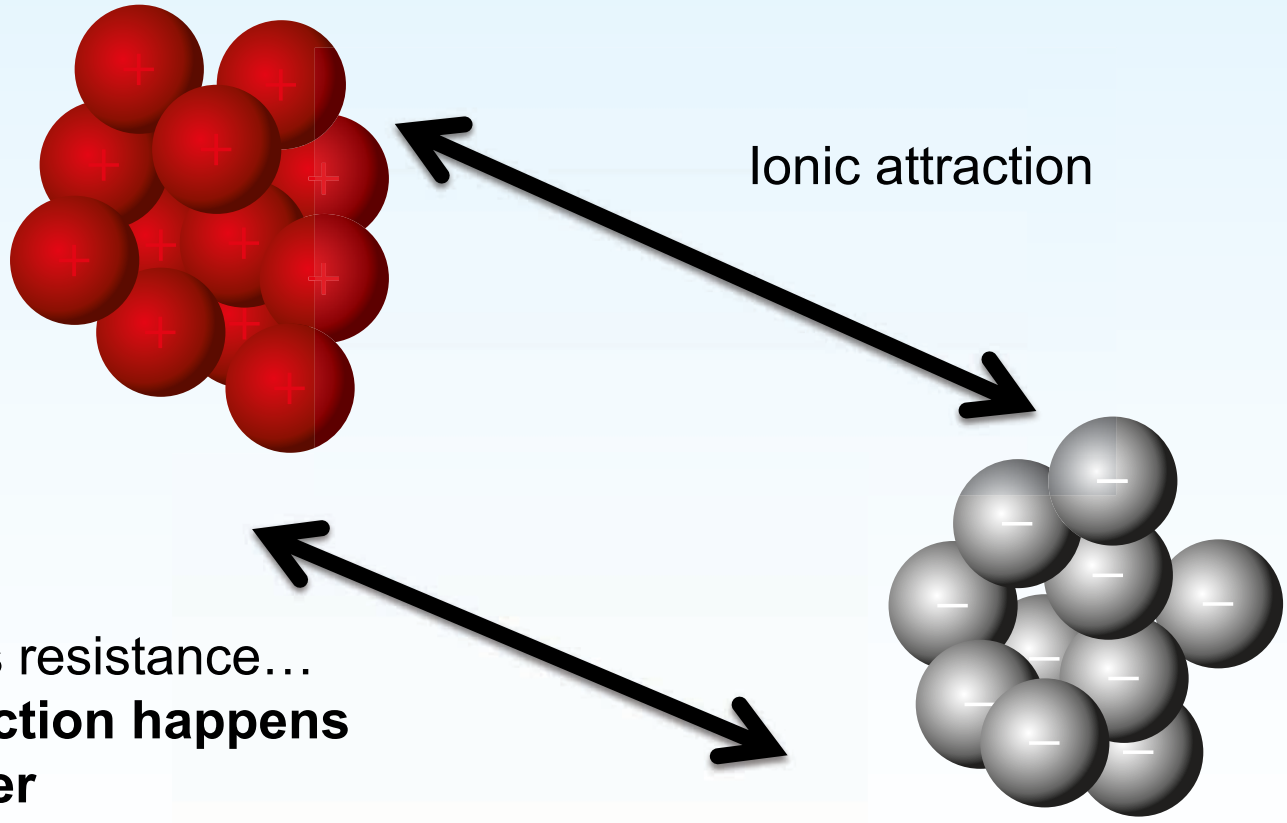
Accelerated Ionic Interactions:

Ionic interactions involve charges. This is similar in many ways to opposite magnetic charges attracting each other.

Water between particles add resistance to the attraction.

Bio-Organic Catalyst fine micro-bubbles reduce this resistance by bringing particles closer together as they self organize through employing a negative charge which is attracted to the positive charge of the organic components.

Ionic Interactions

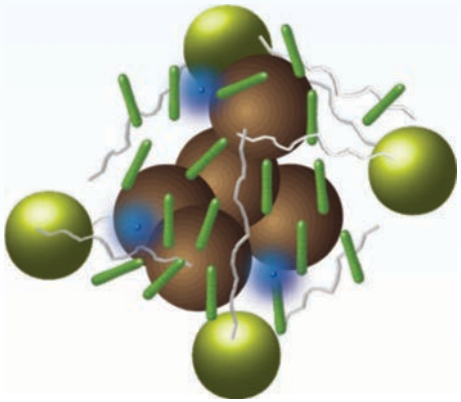


Activation of Biomass

Activated biomass is bacteria that is well conditioned to reduce the contamination it comes into contact with.

When activated, bacteria acclimate to the presence of the contaminate under favorable conditions.

In an aerobic system, this means ample oxygen, soluble food and correct nutrients.



Fiber-Cat™ - Advanced Bio-Catalytic Chemistry in Paper Production:

- Cleaning and prevention of slime deposits.
- Reducing breakage, and reduces micro-holes.
- Improve production conditions, and personnel safety.
- Improves water discharge quality.
- Reduction of odors in paper support systems closed water circuits.
- Increases dissolved oxygen in process water.
- Superior bio-dispersant capabilities enhance cleaning of of inks, waxes, resins, and starches.
- Preserves the machine and equipment by reducing deposits.
- Improves pulping speeds up to 90%

Phyto-C3™ - Water/Soil Conditioner:

- Maintains clean and free flowing irrigation lines and emitters.
- Promotes aerobic soil conditions and soil microbiology.
- Improves moisture penetration and retention.
- Enhances the bioavailability of nutrients.
- Improves root growth.
- Enhances plant health and harvest yields.

The Bio-Organic Seal of Safety® is our commitment to offering the highest quality green chemistry product lines in the market today.

BOC products have been extensively and independently tested, and have been shown to be safe and non-toxic to water bodies and marine life, offering a new model for green chemistry that can actually improve the overall health of ecosystems.