Graphene Leaders Canada
"Making Great Products Even Greater"

Water Filtration Platform

Focused on Advanced Water Filtration Solutions to Serve our Planet

Application Areas to Include:

- Mining Operations
- Industrial Operations
- Selenium/Arsenic Removal
- Heavy Metal Removal
- GLC+ Fiber - Hydrocarbon Sorption
- Tailings Pond Reclamation
- Fracking Water Remediation
- Waste Water Treatment
- Blue/Green Algae Filtration
- Desalination

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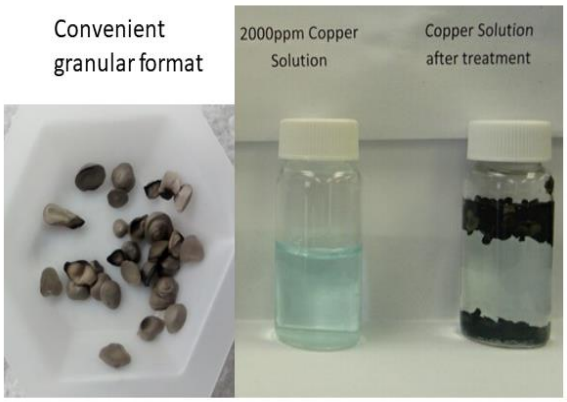
Graphene in Water Treatment

Graphene is a single layer of pure carbon atoms, well known for its excellent conductivity (electronic and thermal), strength, flexibility, chemical stability and excellent lubricity and barrier properties. When oxidized, the graphene oxide product displays excellent hydrophilicity, and tailorable surface chemistry that can be used as an adsorbent for heavy metals. The product can also be modified or functionalized to target a wide range of contaminants ranging from inorganic anions, to organic dyes and other contaminants, leading to wide spread potential applications.

Technology Benefits

- Simple physicochemical interaction affixes certain molecules/ions to a material surface
- Adsorbents are ideal solution for low concentration contaminants
- Easy to apply to existing water treatment systems in a column, fluidized bed, or as a loose adsorbent
- Can be selective for certain contaminants
- Can be regenerated and the by-products isolated for future use
- The traditional chemical water treatment technique known as Flocculation/coagulation is not suitable for removal of trace metals
- High cost of reverse osmosis makes it impractical for large scale operations

GLC+ Filtration Platform



Note: (Left) copper rich water with characteristic blue colour, (right) similar sample containing GLC+ Filtration Bead following 24 hours agitation showing lower apparent copper content.

GLC+ Benefits

Simple, Versatile GLC+ Technology Is Ideal For:

- Selective Filtration
- Nanomaterial Enhanced Surface Area
- Better Performance Profile
- Recyclable - Controllable Renewal
- Hydrophobic/phyllic Tuning
- Extreme Temperatures
- Conductivity
- Tailings Management
- Water Resource Management
- Removal of contaminants
- Precious Metals Recovery
- **Specialty Applications**

GLC+ Filtration Platform

Proof of Concept (Heavy Metals):

- Developed method for preparing graphene oxide polymer composite bead with porous surface
- Adsorption of Cu^{2+}, Zn^{2+}, Ni^{2+} and Pb^{2+}
- Beads were regenerated and used in subsequent adsorption experiment

Proof of Concept (Selenium):

- Developed graphene oxide nanocomposite Good removal of selenite and selenate (pH 2)
- Good response in the presence of competing ions
- Incorporated in easy to use polymer composite bead

Key Milestones

- November 2015- Developed first generation selenium adsorbent
- February 2017- Invented graphene nanocomposite bead as granular adsorbent for heavy metal sorption
- April 2017- Adapted bead chemistry to target inorganic selenium

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