MATERIUM - 1300 INDUSTRIAL BLVD., GRANBY (QUÉBEC, CANADA J2J 0E5
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SOLUTIONS FOR BIO-APPLICATION : MAT540 SERIES

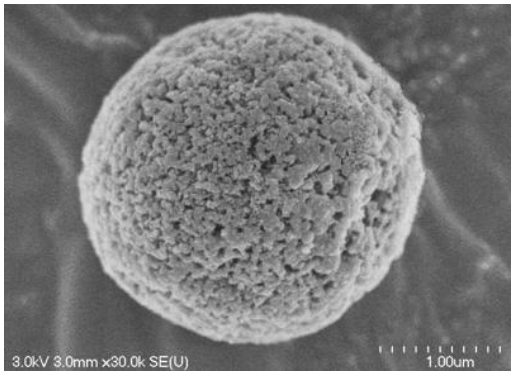
HOLLOW SILICA MICROSPHERES

DESCRIPTION

Bio-Application
Silica microspheres can be used for bio applications such as media support for microorganism's growth, immobilization support for enzymes and additives for concentration/purification of biomolecules.

Hollow silica microsphere offer:

- Media support for microorganism growth (bacteria, yeast, mold, fungi)
- Mesoporous media support for enzyme reactor
- Adsorption of biomolecules for separation and purification (proteins, hormones, enzymes, polysaccharides, lipids, pyrogen, antibodies)



MET image of our hollow silica microsphere

PROPERTIES

- Available in different particle sizes from 1 to 70 µm. Our two typical products have a size (D50) around 10 and 30 µm
- Surface area of 100 m^2/g ($2X10^7$ m^2/m^3) and more
- Particles covered with polar and non-polar chemical groups
  Can be functionalized with other organic or inorganic species for specific applications
- Can be dispersed in water, alcohols and other organic solvents.
- Possibility to encapsulate concentrated nutrients and permit slow and extended release

TYPICAL PROPERTIES*

Chemical Name	Silicon dioxide
Structure	Amorphous
Surface Groups	Organic polar and non-polar groups
Powder density	0.3±0.03 g/mL
Purity (powder)	> 99 %
Surface Area	> 100 m2/g
Pore size	15 - 30 nm

SPECIFICATIONS

Morphology	hollow silica particles
Size	Different sizes from 10 to 30 microns

Forms supplied

- White Powder (free-flowing powder)
- Dispersion in solution (Water, alcohols, DMF, acetone, etc.)

Custom Synthesis

- Special sizes
- Custom surface modifications (functionalization with organic, inorganic, metallic or biological species)

**Values stated in this technical data sheet represent typical values as not all tests are run on each lot of material produced. For formalized product specifications, please contact us.*

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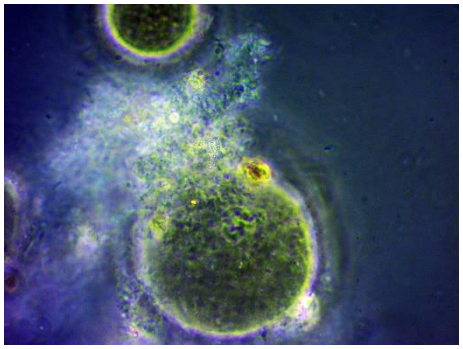

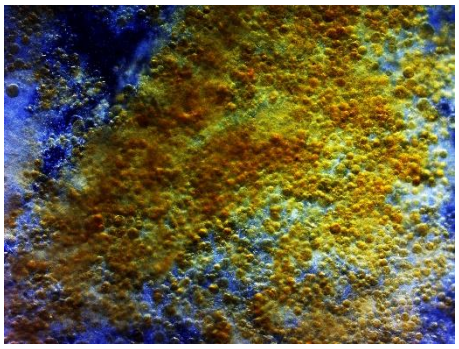

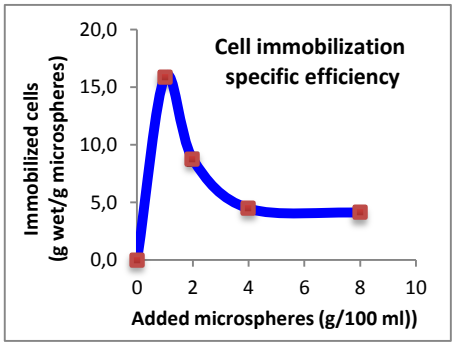

BENEFITS AS A CARRIER OF MICROORGANISMS

- Reduced incubation time and increased growth rate
- Increased microbial density
- Reduced washout
- Increased productivity
- Increase resistance of bacteria to physico-chemical changes and toxic contaminants.
- Possibility to encapsulate concentrated nutrients and permit slow and extended release of nutrient to the microorganism
- Can be used with different microorganisms such as bacteria, yeast and mold
- Reduce sedimentation time of immobilized microorganisms

BENEFITS FOR ENZYME IMMOBILIZATION

- Mesoporous media for immobilization in enzymes reactor
- Allow enzyme recovery using the microsphere properties
- Retains enzyme's activity
- The pore's microenvironment increase the enzyme stability
    - Increased resistance to temperature change
    - Increased resistance to pH changes
    - Prevent water crystallization below freezing point
    - May increase enzymatic activity

CAUTIONARY INFORMATION

Before using this product, refer to the Material Safety Data Sheet (MSDS) label for use and handling instructions.

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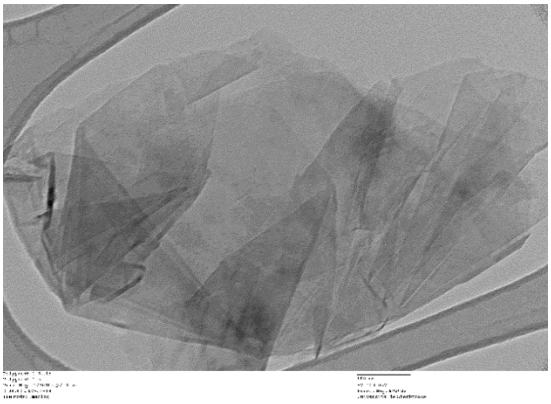
GRAPHENE FLAKES

MAT540GF SERIES



PROPERTIES AND BIO-APPLICATIONS

- Greatest surface area (> 500 m^2/g)
- Can be used to induce sporulation
- Possibility of surface functionalization with different chemical groups
- Efficient adsorption of biomolecules

SPECIFICATIONS

Flake size: 1-20 µm
Average thickness: 5-7 nm
Specific area: > 500 m^2/g
Surface chemistry: Can be oxidized if necessary
Functionalization: Custom surface functionalization with several organic groups

CAUTIONARY INFORMATION
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