



## **Titanium Dioxide Beads (Thick shell), 1 $\mu\text{m}$ -TiO<sub>2</sub>**

### **PRODUCT DATA SHEET**

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### **Description**

Phosphorylation is a common reversible post-translational modification that plays a regulatory role in many biological processes such as cell signaling, so it is of great significance in the study of many diseases such as cancer. The understanding of phosphorylation helps to understand the process of disease. Phosphoproteins and phosphopeptides are usually extremely low in concentration and poorly ionized, making them difficult to detect by mass spectrometry (MS). Therefore, there is an urgent need for enrichment techniques that can specifically enrich phosphopeptides and are compatible with mass spectrometry.

Titanium dioxide has a selective affinity for enrichment of phosphoserine (pSer), phosphothreonine (pThr) and phosphotyrosine (pTyr) residues. TiO<sub>2</sub> magnetic beads are a proprietary microparticle carrier of magnetic materials, which can be simple, convenient, efficient, highly specific and highly repeatable to enrich phosphorylated peptides in the protein digestion of complex biological samples. The TiO<sub>2</sub> nanoparticles on the surface of the magnetic beads have no obvious preference for single phosphorylpeptides and polyphosphorylpeptides, so they are very suitable for single-step enrichment of phosphorylpeptides for mass spectrometry-based proteomic analysis. In addition, TiO<sub>2</sub> magnetic beads can separate extracellular vesicles (EVs) such as exosomes by binding to phospholipid bilayer membranes. TiO<sub>2</sub> captures sEVs by forming a double-tooth structure with the phosphate group of EVs bilayer phospholipids, and the magnetic core can further separate the magnetic bead-SEVS complex. The binding of magnetic beads to EVs is reversible, and the captured sEVs can be eluted and collected by cleaning with an alkaline solution.

Abvigen offers high quality titanium dioxide magnetic beads (thick shell). Titanium dioxide magnetic beads (thick shell) are coated with a thicker titanium dioxide shell, which is more stable and can be used in more intense chemical environments. Titanium dioxide magnetic beads combine the advantages of rapid external magnetic field response of magnetic materials and the stability of metal oxides, and have a high specific surface area, which simplifies the enrichment process of phosphorylated peptides and improves the enrichment flux.



For custom sizes, formulations or bulk quantities please contact our customer service department.

Website: [www.abvigen.com](http://www.abvigen.com) Phone: +1 929-202-3014 Email: [info@abvigenus.com](mailto:info@abvigenus.com)

### Characteristics

Type: Titanium Dioxide Beads (Thick shell), 1  $\mu\text{m}$ - $\text{TiO}_2$

Particle size: 1  $\mu\text{m}$

Surface:  $\text{TiO}_2$

Dispersing solvent: Ultrapure water

Concentration: 25 mg/mL

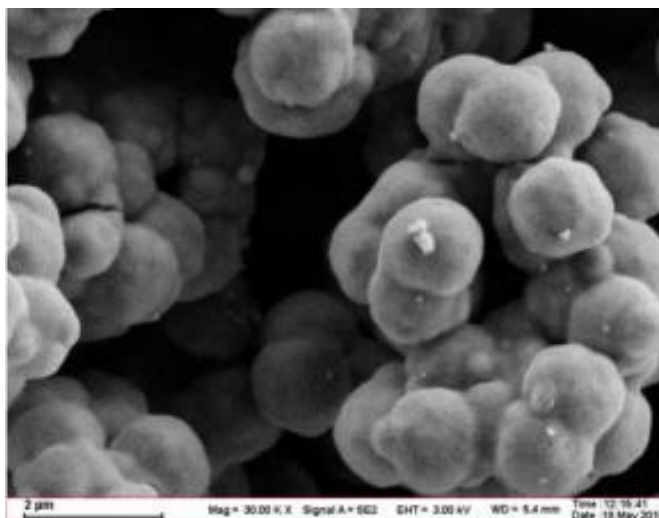
Size: 2/5/10 mL

Storage condition: Store sealed at 2~8°C.

Shelf life: 36 months

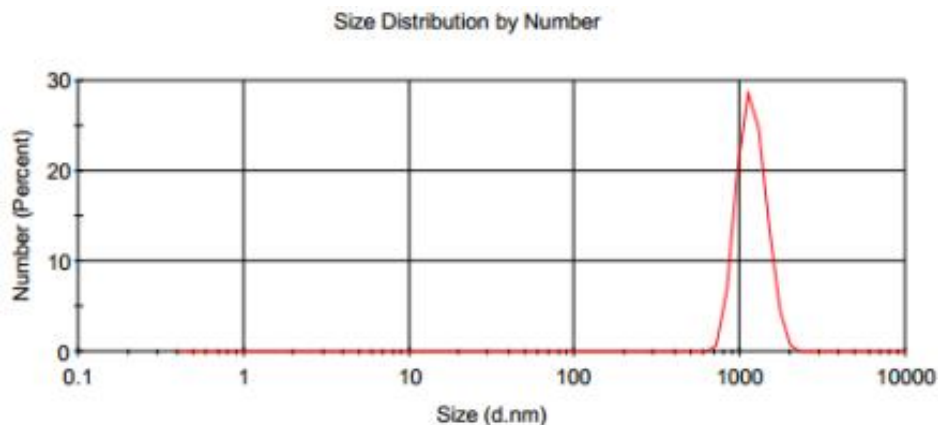
Package: Plastic bottle

### SEM of Titanium Dioxide Beads (Thick shell), 1 $\mu\text{m}$ - $\text{TiO}_2$



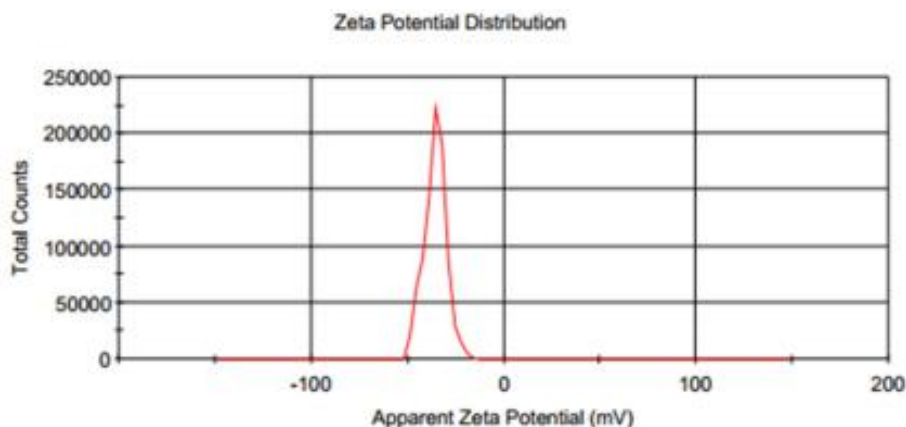
The average size of titanium dioxide magnetic beads (thick shell) is 1.45  $\mu\text{m}$ .

## Dynamic Light Scattering (DLS) Hydrodynamic Dimensions



The DLS hydrodynamic size of the titanium dioxide magnetic bead (thick shell) is 1185 nm and the PDI is 0.373.

## Zeta Potential



The Zeta potential of the titanium dioxide magnetic bead (thick shell) is -35.7 mV.

## Advantages

High specificity for phosphorylated peptides and exosomes.

There was no obvious preference between monophosphorylated peptides and polyphosphorylated peptides.

Fast magnetic response of less than 30 s, reducing sample loss and more suitable for automated operation.

Antioxidant properties reduce the risk of sample contamination.



## Applications

Enriched phosphorylpeptide

Proteomic analysis based on mass spectrometry

Isolation of exosomes and other extracellular vesicles (EVs) by binding phospholipid bilayer membranes

## Storage

It can be sealed stored at 2~8°C for 36 months.

## Exosome Extraction

Loading buffer: 10 mM PBS (pH=7.4)

Eluting buffer: PBS solution containing 10% ammonia (10 mM PBS is adjusted with 25% ammonia to pH 11.1, and the content of ammonia in PBS is 10%)

TiO<sub>2</sub> beads are stored in pure water at a concentration of 25 mg/mL. Before use, the magnetic beads should be washed and balanced (restored to room temperature), and the amount of magnetic beads can be enlarged and reduced according to actual needs.

- 1) Vortex mixing TiO<sub>2</sub> magnetic beads to ensure uniform dispersion.
- 2) Transfer 200  $\mu$ L (5 mg) TiO<sub>2</sub> beads to 2 mL centrifuge tube.
- 3) Place the centrifugal tube on the magnetic separator, place it for 30 s, and remove the supernatant.
- 4) Gently wash particles with 200  $\mu$ L of 10 mM PBS (e.g., intermingle or vortex mix) for 5 min.
- 5) Place the centrifugal tube on the magnetic separator, place it for 30 s, and remove the supernatant.
- 6) Repeat steps 4 and 5.
- 7) 100  $\mu$ L sample (serum containing exosomes) was added to the magnetic beads and incubated at 4°C for 5-10 min.
- 8) Place the centrifugal tube on the magnetic separator, place it for 30 s, magnetic separation removes the supernatant, and clean it with 10 mM PBS (pH=7.4) for 2-3 times.
- 9) Remove the magnetic field, add PBS solution containing 10% ammonia water into the magnetic bead-exosome complex, and incubate at 4°C for 5-10 min to release the exosomes from the magnetic beads.
- 10) The centrifugal tube was placed on the magnetic separator for 30 s to take the supernatant exosome suspension, and the pH of the exobody weight suspension could be further adjusted by ultrafiltration.



Note: Ammonia is corrosive, please refer to the safe operation instructions.

### Notes

1. Titanium dioxide magnetic beads will settle after standing for a long time, please use them after fully stirring or mixing.
2. Sealed, stored in the refrigerator at 2-8°C, avoid drying into blocks, avoid freezing and thawing.

### Ordering Information

Website: [www.abvigen.com](http://www.abvigen.com)

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