Titanium Dioxide Beads (Thin shell), 4.5 μm-TiO_2

Description

Protein phosphorylation is involved in a variety of cellular processes, about 30% of proteins can be phosphorylated, and many studies have focused on the post-translational modification of proteins. However, phosphoproteins and phosphopeptides are usually extremely low in concentration and poorly ionized, making them difficult to detect by mass spectrometry (MS). Therefore, phosphorylated peptide enrichment techniques compatible with mass spectrometry are urgently needed.

Titanium dioxide has a selective affinity for phosphoserine (pSer), phosphothreonine (pThr) and phosphotyrosine (pTyr) residues, so titanium dioxide magnetic beads coated with TiO_2 shells can be simple, convenient, efficient, highly specific, and highly repeatable enrichment of phosphorylpeptides in protein digestion of complex biological samples. The TiO_2 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 spectromet-based proteomic analysis. In addition, TiO_2 magnetic beads can separate extracellular vesicles (EVs) such as exosomes by binding to phospholipid bilayer membranes. TiO_2 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.

The titanium dioxide magnetic beads are monodisperse micrometer magnetic beads with uniform size, and the surface of the magnetic beads is composed of silicon dioxide shell and titanium dioxide shell. The surface of the magnetic beads has the advantages of high specific surface area, strong saturation magnetization, fast magnetic response time and so on. The silica shell can protect the magnetic composition, so that the magnetic beads can be used in more intense chemical environments. The rough surface structure provides a larger contact area of the titanium dioxide shell, resulting in more efficient capture of phosphorylated protein components.

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

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Characteristics

Type: Titanium Dioxide Beads (Thin shell), 4.5 μm-TiO_2

Particle size: 4.5 μm

Surface: TiO_2

Dispersing solvent: Ultrapure water

Concentration: 25 mg/mL

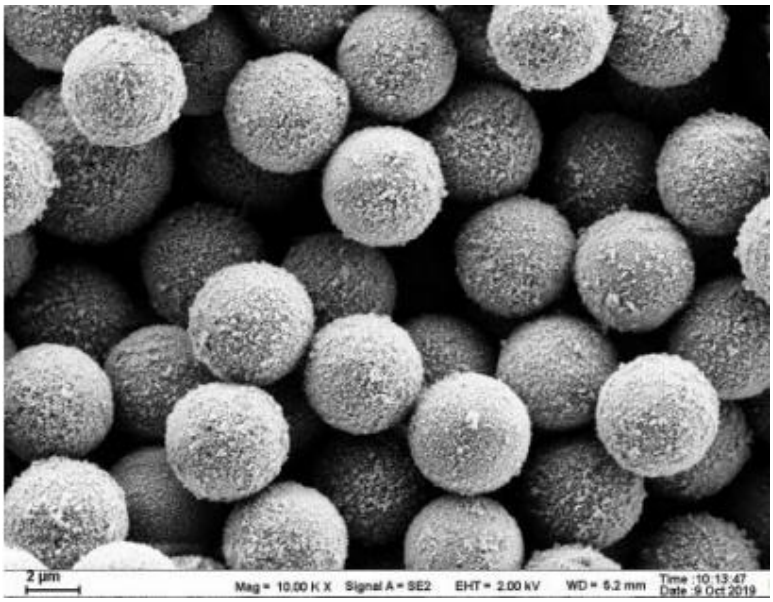
Size: 2/5/10 mL

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

Shelf life: 36 months

Package: Plastic bottle

SEM of Titanium Dioxide Beads (Thin shell), 4.5 μm-TiO_2



Advantages

1. The size of titanium dioxide magnetic beads is very uniform, the dispersion is good, the surface roughness microstructure is obvious, and the specific surface area is high.

2. The multi-shell structure of titanium dioxide magnetic beads is more stable and can be used in more intense chemical environments.

3. The magnetic composition of titanium dioxide magnetic beads is relatively large, with strong saturation magnetization, fast magnetic response time and other advantages.

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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_2 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_2 magnetic beads to ensure uniform dispersion.

2) Transfer 200 µL (5 mg) TiO_2 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 µL 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 µL 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.

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

Notes

1. The product will settle after standing for a long time, so it needs to be fully mixed before use.

2. The product is dissolved in pure water, avoid drying into chunks, avoid freezing and thawing.

Ordering Information

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