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# Selective Enrichment of Glycopeptides/Phosphopeptides Using $Fe_3O_4$@Au-$B(OH)_2$@$mTiO_2$ Core-Shell Microspheres

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## Abstract:

**In this work, the bifunctional $Fe_3O_4$@Au-$B(OH)_2$@$mTiO_2$ core-shell core-shell microspheres were designed and synthesized for the selective enrichment of glycopeptides/ phosphopeptides. Due to the bifunctional property of the titanium dioxide and the boronic acid group, the microspheres were successfully applied to the enrichment of phosphopeptides and glycopeptides, evaluated by capturing phosphopeptides from tryptic digestion of model phosphoprotein bovine *β*-casein diluted to 2.0 pg $\mu L^{-1}$ ($8.0 \times 10^{-17}$ mol $\mu L^{-1}$) and glycopeptides from tryptic digestion of model glycoprotein horseradish peroxidase (HRP) diluted to 80 pg $\mu L^{-1}$ ($2.0\times10^{-15}$ mol $\mu L^{-1}$). The enrichment selectivity of the bifunctional microspheres was evaluated by capturing phosphopeptides from a peptide mixture of *β*-casein and bovine serum albumin (BSA) with the molar ratio of 1:1000 ($4.2\times10^{-12}$ mol of *β*-casein and $4.2\times10^{-9}$ mol of BSA in 100 μL) and glycopeptides from a peptide mixture of HRP and BSA up to the ratio of 1:100 ($5.0\times10^{-12}$ mol of HRP and $5.0\times10^{-10}$ mol of BSA in 100 μL).**

**Keywords：boronic acid, titanium dioxide, glycopeptides, phosphopeptides, enrichment, MALDI-TOF mass spectrometry**

## Introduction

As the most important and abundant post translational modification of proteins, protein phosphorylation and glycosylation play the important role in biological processes including immune response, signal transduction, and particularly in cancer