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Fabrication of porous monolithic materials of reactive polymers for protein purification

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Along with the rapid development of diagnosis and proteomic science, the requirement for the purification of biomolecules like proteins, enzymes and nucleic acids becomes extremely urgent. Protein A chromatography and immobilized metal ion affinity chromatography are regarded as the most efficient and promising methods for the protein purification. For these two techniques, the solid support is the crucial part for the protein purification efficiency and specificity. Polymer-based monoliths with tunable bulk and surface properties have attracted considerable attention due to their unique open-cellular three-dimensional porous structure. Recently, we have developed fabrication of such monolithic materials by phase separation of polymer solutions. The present talk deals with functional monoliths based on reactive polymers such as cellulose and poly(vinyl alcohol-co-ethylene) for protein purification. Protein A was introduced on the monolith of these polymers via suitable chemical activation. For an application of immobilized metal ion affinity chromatography, ethylenediaminetetraacetic acid was introduced into these monoliths and nickel ions were located subsequently. IgG and His-tagged proteins were immobilized on these activated monoliths. The protein purification amount and efficiency were evaluated.

Biography

Hiroshi Uyama received his BS (1985) and MS (1987) from Kyoto University. In 1988, he joined the Department of Applied Chemistry, Tohoku University, as Research Associate and obtained PhD. He moved to the Department of Materials Chemistry, Kyoto University in 1997. In 2004, he was appointed as a full Professor at the Department of Materials Chemistry, Osaka University. He has published over 270 original papers, 170 book chapters and reviews, and has over 140 patents.

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