

Development of highly efficient analytical systems using integrated functional molecules

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Highly efficient and selective separation methods for biomolecules have been strongly desired, because microanalysis and comprehensive analysis in bio- and environmental- samples become important. We designed and developed high efficient separation methods based on the molecular recognition and miniaturization technique. I introduce three ongoing projects in this talk.

1) Study of separation mechanism and development of the high efficient columns.

High efficient column was developed based on the recognition studies using HPLC, NMR, and so on. The developed column separated biological compounds within few minutes and their theoretical plate numbers reached few hundreds thousand/m.

2) High selective separation column using micron-scale technique.

We developed an immobilized technique of biomolecules, which showed high selectivity. The immobilized technique was available for the fixation of biomolecules into the small space, such as capillary and microchip.

3) Separation of micron- and nano- scale compounds.

Although many new nanomaterials have been created and attracted many attentions recently, there have been few reports concerning separation and purification methods for these materials. I introduce our recent progress about the separation of these nano- and micron- scale materials.