Spatially Controlled Release of Self-Folding Hydrogel Microparticles

심태섭, 양승만*
KAIST
(smyang@kaist.ac.kr*)

We report a facile strategy for efficient drug release by using self-folding hydrogel bilayer microparticles. Since hydrophobic drugs can be encapsulated in pre-defined hydrogel microparticles, drugs can be released only to captured targets by controlling the shape of hydrogel microparticles with self-folding. To achieve this, hydrogel bilayer microparticles consisted of poly(2-hydroxyethyl methacrylate-co-acrylic acid), p (HEMA-co-AA), as a active layer and poly(2-hydroxyethyl methacrylate), p(HEMA), as a passive layer were fabricated using conventional photolithography process. As a result, a planar bilayer microparticles showed transformation of shape to 3D microcapsules by anisotropic volume phase transition at basic condition. To demonstrate spatially controlled release, oil drops containing hydrophobic fluorescence dye were incorporated to p(HEMA) layer. Because p(HEMA) layer formed inner layer while p(HEMA-co-AA) layer formed outer layer, dye was released only to cavity of microcapsules by confined geometry, which shows spatially controlled release of active ingredients.