

Preparation of inverse opal hydrogel based on the poly(ethylene glycol) and It's applications

박상필, 이우진, 이 열, 김대년, 장은지, 박새미, 고원건*
연세대학교 화학공학과
(wongun@yonsei.ac.kr*)

Non-crosslinked, monodisperse polystyrene spheres were synthesized using an emulsifier-free emulsion polymerization technique and ordered structure of nanoparticles was obtained by gravity sedimentation method. 3D arrays of PEG-based hydrogel inverse opals were fabricated via capillary-attraction-induced methods by using polystyrene nanoparticles as sacrificial templates. Before removing the PS nanoparticles, PAA networks were incorporated inside PEG hydrogel in order to not only improve the mechanical properties of hydrogel, but also provide functional group that can covalently immobilize various biomolecules. After INP hydrogels were formed, the sample was immersed in dimethylbenzene for completely removing polystyrene spheres to produce inverse opal hydrogels. Morphology of inverse opal hydrogel was investigated with SEM or optical microscopy and mechanical properties of hydrogel were studied by measuring the tensile strength. As a possible application, several enzymes were immobilized on the inverse opal hydrogel surface and enzyme-substrate reaction was investigated using label-free method.