

Fabrication of three dimensional SBA-15 scaffold with hierarchical macropores and sopores for immune cell recruitment

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Hierarchical porous scaffolds have been interested in diverse fields such as separations, and tissue engineering because hierarchical porosity improves material properties such as mechanical properties, transport properties, and molecule selectivity. Here, we introduce a new approach to fabricate hierarchical macroporous and mesoporous silica scaffold. This method is composed of two steps; 1) compacting mesoporous silica, the building blocks of the scaffold, and sodium chloride, sacrificial macropore porogen, into a designated shape, 2) leaching out the sodium chloride to generate macropores. This method may offer facile synthetic route of hierarchically structured porous materials by using existing multi-scale porous materials as a building block. This scaffold showed that controllable mechanical properties by changing the interconnection mechanism between mesoporous silica, which allows the high structural stability during diverse process such as in vivo implantation. The scaffolds were implanted into the mice and we found that high number of host immune cells were recruited into the macropores, which shows their potential use for immunomodulation.