

Facile Preparation of Thermoresponsive Biomaterials by Noncovalent Immobilization of Hyperbranched Polymers

Yu SUDO, Yuta NABAE and Masa-aki KAKIMOTO

Department of Materials Science and Engineering,
Tokyo Institute of Technology, Tokyo 152-8552, Japan
E-mail : mkakimot@ab.auone-net.jp

We introduce novel biomaterials prepared by the non-covalent immobilization of graft copolymers composed of hyperbranched polymers and a thermoresponsive polymer. Poly(*N*-isopropylacrylamide) (PNIPAM) was anchored on silica beads with hyperbranched polysiloxysilane (HBPSi) and was effective as a three-dimensional cell-cultivation material. An HBPSi graft copolymer with PNIPAM arms was drop cast onto a glass slide. The polymer-coated surface was thermoresponsive and was used in cell sheet engineering. A hyperbranched polystyrene (HBPS_t) graft copolymer with PNIPAM arms was prepared and drop cast onto a polystyrene dish; this sample also showed good thermoresponsive behavior and cell sheet recovery performance. Langmuir-Blodgett film experiments reveal that the hyperbranched structures contribute to the exposure of HBPS_t segments to the substrate, and are most likely responsible for enhanced copolymer immobilization.

Keywords : Hyperbranched polymer, Thermoresponsive polymer, Biomaterial