An amphiphilic comb polymer electrolyte membrane fabricated with 1D hierarchical carbon nanotube electrode for all-solid-state supercapacitors

강두루, 민효준, 박병주, 김종학†
연세대학교
(jonghak@yonsei.ac.kr†)

Herein, we report a flexible, solid-state supercapacitor (ssSC) based on a comb polymer (CP) solid electrolyte and one-dimensional (1D) porous carbon nanotube (CNT) electrode. The solid-state electrolyte is prepared by synthesizing an amphiphilic CP comprising hydrophobic poly(vinylidene fluoride-co-chlorotrifluoroethylene) (P(VDF-co-CTFE) and hydrophilic poly(oxyethylene methacrylate) (POEM) via one-pot atom transfer radical polymerization (ATRP). An ionic liquid with CP matrix (CPIL) was used to constitute electrolyte, and the ionic conductivity of CPILs was analyzed by loading the amount of ILs and grafting ratio of CP. Two types of 1D hierarchical CNTs are fabricated through MOF-derived approach using 1D tellurium as a template. This strategy gives good instruction for designing excellent supercapacitors.