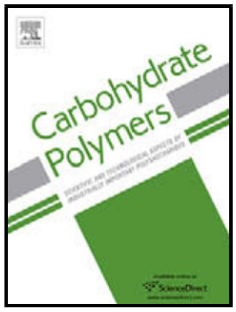

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Multifunctional colloidal nanofiber composites including dextran and folic acid as electro-active platforms

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Highlights

- Novel biopolymer based nanofiber composites were fabricated by electrospinning.
- Physical/chemical structures and electrical parameters of NFCs were evaluated.
- Effect of complexing behaviors of all components on electro-activity was estimated.
- Absorption of doping agents significantly improved conductivity of NFC thin films.
- Fabricated NFCs are promising candidates for as electro-active platforms.

Abstract

This work presents the fabrication and characterization of novel colloidal multifunctional polymer nanofiber composites (NFCs) from water dispersion blends of intercalated silicate layered nanocomposites of poly (2-vinyl-N-pyrrolidone)/octadecyl amine-montmorillonite (ODA-MMT) and dextran/ODA-MMT as matrix and partner polymer intercalated nanocomposites in the presence of NaOH and folic acid (FA) as doping agents by green reactive electrospinning. Chemical and physical structures, surface morphology and electrical properties were investigated. Effects of matrix/partner polymer ratios, doping agents, absorption time of NaOH, and temperature on electrical parameters of NFCs were evaluated. The presence of FA and increasing dextran fraction in NFCs resulted in reducing fiber diameter and improving diameter distribution. High complexing behaviors of matrix/partner polymer chains, organoclay, FA, and NaOH significantly improved conductivity parameters, especially 5-min of absorption time ($\approx 10^{-2}$-10^{-3} Sm^{-1}). The conductivity of the samples decreased with increasing temperature. NFCs fabricated for the first time