

Synthesis and characterisation of highly fluorescent polythiophene based composite nanofibers

ABSTRACT

Fluorescent conducting polymer, polythiophene (PT) and PT derivative, poly (3-hexylthiophene) (P3HT) were synthesised using chemical oxidative polymerisation technique. The polymerisation period for PT were varied to examine the effect of polymerisation time on the properties of PT. PT and P3HT showed interesting characteristics including high fluorescent, whereas the PT synthesised in 3 hours (PT(3h)) has shown antimicrobial properties. The antibacterial activity of PT and PT3HT obtained was evaluated against *Bacillus subtilis* (B145), *Escherichia coli* (E266), and *Candida albicans* (C244). This antibacterial study demonstrated that PT (3h) contains antimicrobial properties on both *Bacillus subtilis* and *Escherichia coli*. From the solubility test, PT (3h) and P3HT were further used in the preparation of the composite nano/microfibers with polystyrene (PS) through electrospinning technique. These fibres have the potential to be used in a range of applications that includes antimicrobial materials and sensing.

Keyword: Antimicrobial; Conducting polymer; Electrospinning; Nanofiber; Polythiophene