Cellulose, Chitosan and Keratin Composite Materials.

Controlled Release of Drug

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SUPPORTING INFORMATION

Chemicals

Chitosan (MW≈310-375kDa), derived from chitin from crustacean shells and microcrystalline cellulose (DP≈300),[1] derived from cotton linters, were purchased from Sigma-Aldrich (Milwaukee, WI). The degree of deacetylation of chitosan, determined by FT-IR, was found to be 84±2 %.[1] Raw sheep (untreated) wool, obtained from a local farm, was cleaned by Soxhlet extraction using a 1:1 (v/v) acetone/ethanol mixture at 80±3 °C for 48 h. The wool was then rinsed with distilled water and dried at 100±1 °C for 12 h.[2] 1-Methylimidazole and *n*-chlorobutane (both from Alfa Aesar, Ward Hill, MA) were distilled and subsequently used to synthesize [$BMIm^+CL^-$].[1] Ciprofloxacin (Scheme 1) (TCI America) was used as the model drug. Double-distilled deionized water (18 MΩ cm^{-1}) was used to prepare 1.0 mM phosphate buffer (pH 7.2).

Instruments.

FTIR spectra (from 450-4,000 cm^{-1} were recorded on a Spectrum 100 Series FTIR spectrometer (Perkin Elmer, USA) at resolution of 2 cm^{-1} by the KBr method. Each spectrum was an average of 64 individual spectra. Fluorescence spectra were recorded on a spectrofluorometer (QuantaMaster 40, PTI, Birmingham, NJ) at 2 nm interval; 0.4 sec

integration time; 0.50 nm and 0.25 nm entrance and exit slit widths respectively. The tensile strength of the composite films were evaluated on an Instron 5500R tensile tester (Instron Corp., Canton, MA) equipped with a 1.0 kN load cell and operated at a crosshead speed of 5 mm min^{-1}. Each specimen had a gauge length and width of 25 mm and 10 mm respectively.

REFERENCES

(1) Battista, O. A.; Smith, P. A. Microcrystalline cellulose. Ind. Eng. Chem. 1962, 54, 20-29.

(2) Xie, H.; Li, S.; Zhang, S. Ionic liquids as novel solvents for the dissolution and blending of wool keratin fibers. Green Chem. 2005, 7, 606-608.