

Supporting Informations

Innovative Multifunctional Silk Fibroin and Hydrotalcite Nanocomposites: a Synergic Effect of the Components

Tamara Posati^{a}, Valentina Benfenati^{b*}, Anna Sagnella^b, Assunta Pistone^b, Morena Nocchetti^c,
Anna Donnadio^c, Giampiero Ruani^d, Roberto Zamboni^b and Michele Muccini^{d*}*

^a Laboratory MIST E-R, Via P. Gobetti 101, I-40129 Bologna, Italy.

^b Consiglio Nazionale delle Ricerche, Istituto per la Sintesi Organica e la Fotoreattività (CNR-ISO), Via P. Gobetti 101, I-40129 Bologna, Italy.

^c Dipartimento di Chimica, Università di Perugia, Via Elce di Sotto 10, 06123 Perugia, Italy.

^d Consiglio Nazionale delle Ricerche, Istituto per lo Studio dei Materiali Nanostrutturati (CNR-ISMN), Via P. Gobetti 101, I-40129 Bologna, Italy.

Figures

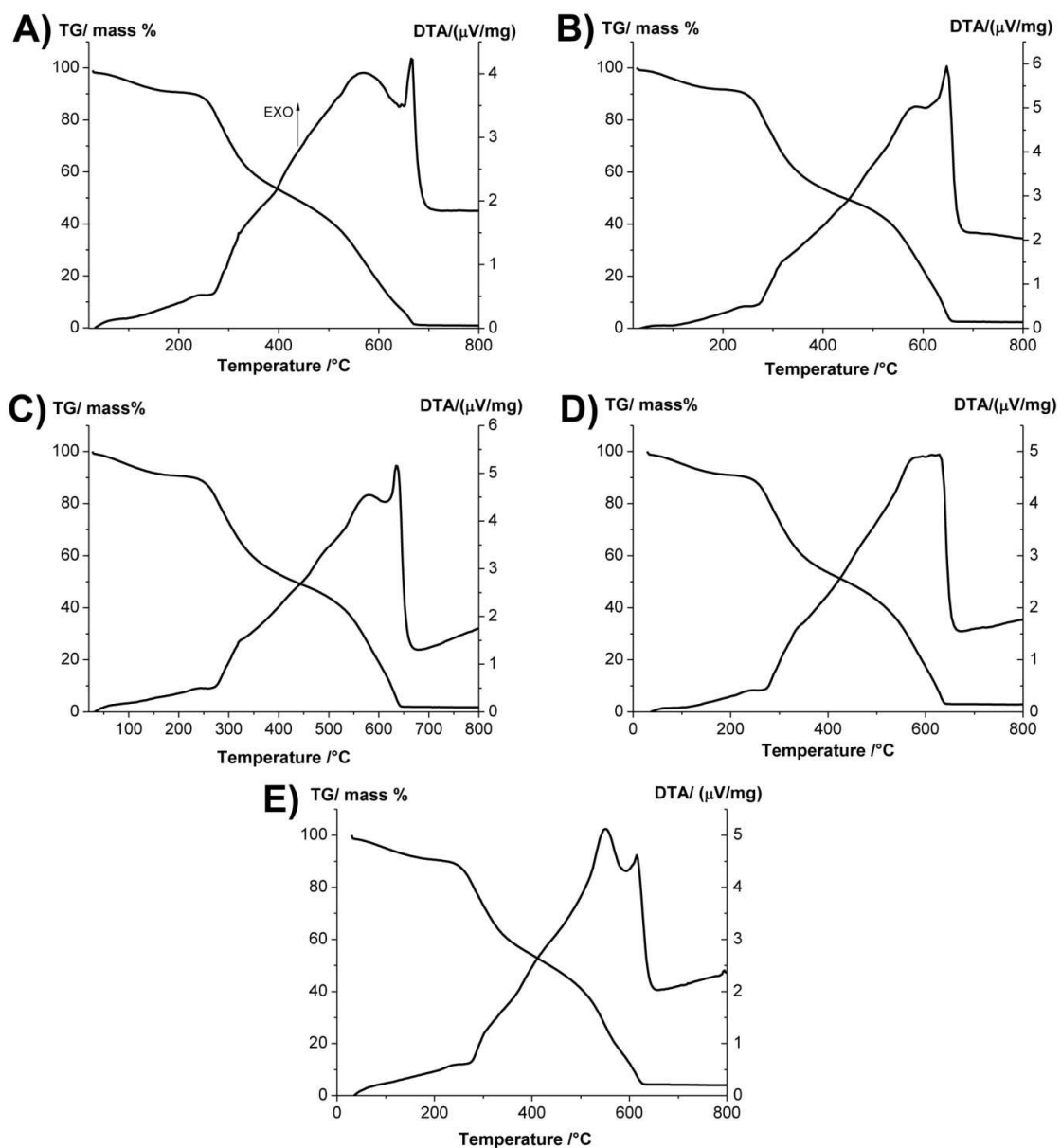


Figure S1. TG/DTA curves of samples SF (A), SF-HTlc0.6 (B), SF-HTlc1.2 (C), SF-HTlc1.8 (D) and SF-HTlc3.6 (E). (Operative conditions: heating rate: 10 $^{\circ}\text{C}/\text{min}$, air flow).

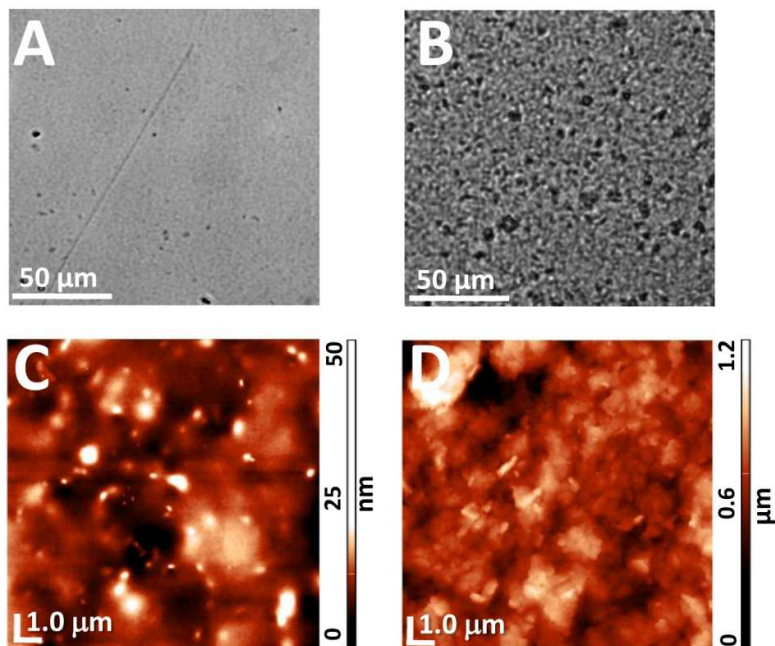


Figure S2. Optical micrographs of: SF-HTlc1.8 hybrid film (A) and ZnAl-HTlc (B). AFM topographical images of: SF-HTlc1.8 hybrid film (RMS~4.5 nm) (C) and ZnAl-HTlc (RMS~130 nm) (D). The ZnAl-HTlc film was fabricated using the same concentration of nanoparticles contained in the SF-HTlc0.6 hybrid film.

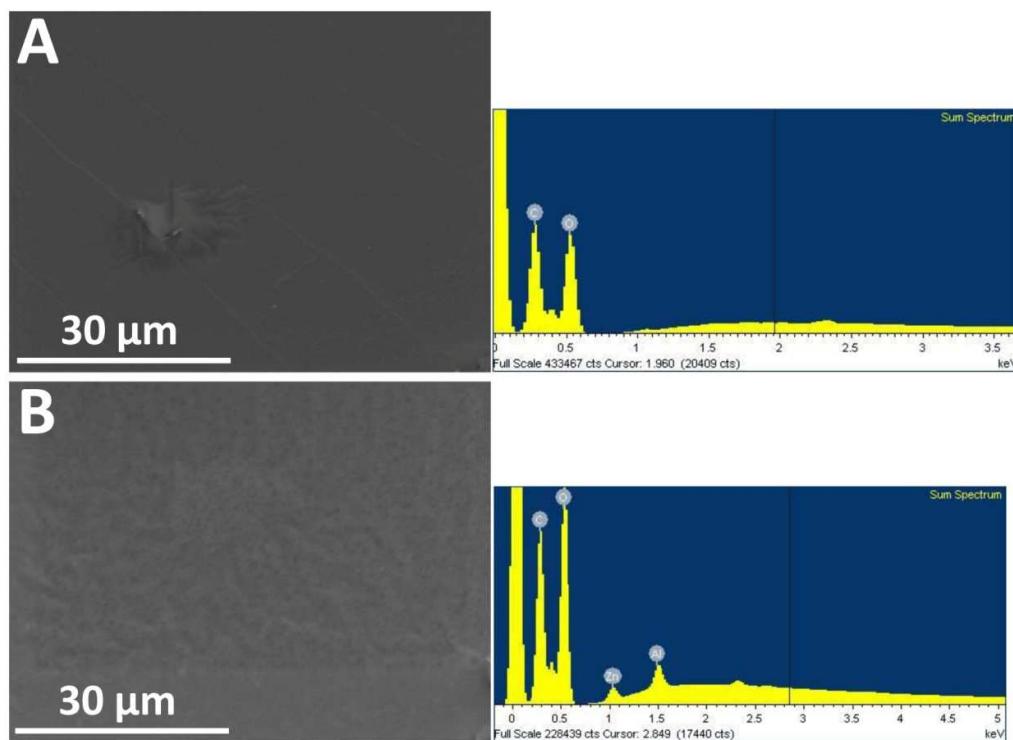


Figure S3. SEM images and EDS pattern of SF (A) and SF-HTlc3.6 (B) samples.

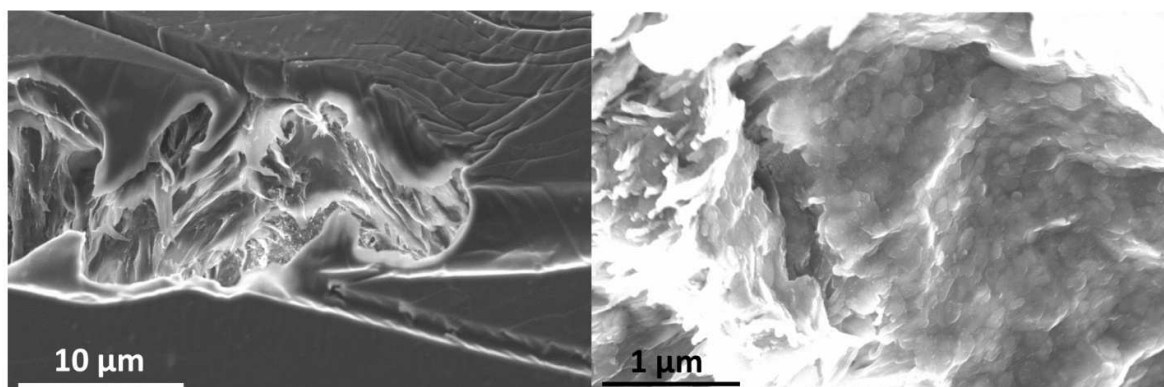


Figure S4. SEM images of the section of the sample SF-HTlc3.6 at different magnifications.

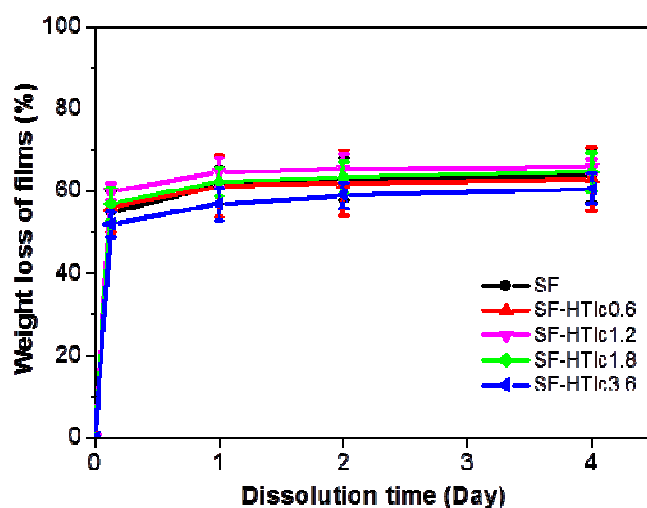


Figure S5: Dissolution profiles of pure SF film (black line) and SF-HTlc nanocomposites in phosphate buffered saline (PBS), pH 7.4. Films were incubated at 37 °C in 3 mL of PBS solution. Each solution contained an approximately equivalent mass (50 ± 2 mg) of silk films (thickness ~ 60 μm). Solutions were replenished with PBS and collected daily. At designated time points (3 h, 1, 2 and 4 days), groups of samples were rinsed in distilled water and prepared for mass balance. Samples were dehydrated in an oven at 50°C for 2 h. Following removal from the oven, the samples were weighed and returned to a new solution with fresh PBS. Percent weight loss over time was determined. Each experiment was performed in triplicate. The pure SF film was taken as the reference.

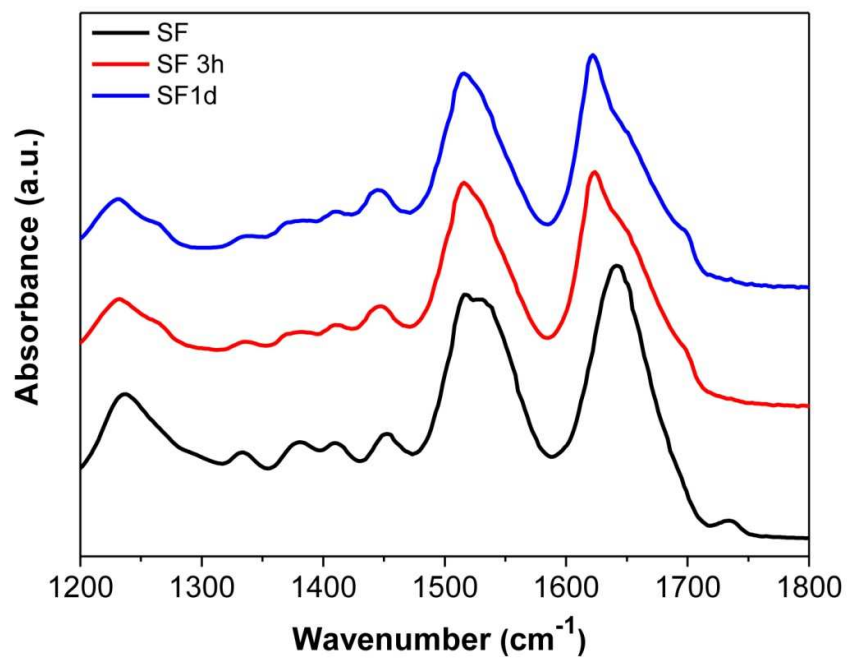


Figure S6. FT-IR spectra of SF film before (black line), after 3 h (red line) and after 1 day of incubation in acidic medium, recorded in the 1200-1800 cm^{-1} region.