Supporting Information

Soy protein-directed one-pot synthesis of gold nanomaterials and their functional conductive devices
Shengjie Ling, Heyi Liang, Zhao Li, Li Ma, Jinrong Yao, Zhengzhong Shao and Xin Chen*

State Key Laboratory of Molecular Engineering of Polymers, Collaborative Innovation Center of Polymers and Polymer Composite Materials, Department of Macromolecular Science, Laboratory of Advanced Materials, Fudan University, Shanghai, 200433, People’s Republic of China. E-mail: chenx@fudan.edu.cn
**Fig. S1** FE-TEM image of gold NPs prepared from 2.5 wt% SPI with 5 mmol/L HAuCl₄ at pH 13 with high magnification (a) and low magnification (b).
Fig. S2 Fluorescence spectra (a, c) and UV-vis spectra (b, d) of SPI/gold NMs solution prepared by different SPI concentration at pH 1 (a, b) and at pH 13 (c, d).
Fig. S3 Effect of hydrolysis time of SPI on the shape and size of gold NMs. (a) SPI/gold NMs solution obtained with 2.5 wt% pre-hydrolyzed SPI and 5 mmol/L HAuCl₄ solution under pH 13, incubated at 60 °C for 6 h. Hydrolysis time: (i) 0 h; (ii) 0.5 h; (iii) 3 h; (iv) 6 h. The top and bottom photos are under visible and UV light observation. (b) SPI/gold NSs solution obtained with 1 wt% of 6 h pre-hydrolyzed SPI and 5 mmol/L HAuCl₄ solution under pH 1 at 60 °C.
Fig. S4 (a) FE-TEM image of gold NCs prepared from 3 h incubation with 2.5 wt% SPI and 5 mmol/L HAuCl₄ at pH 13; (b) FE-TEM image of gold NCs purified by centrifuging SPI/gold NCs colloidal solution (prepared from 96 h incubation with 2.5 wt% SPI and 5 mmol/L HAuCl₄ at pH 13) at 10000 r/min and 30 min.
**Fig. S5** Chemical modification route of SPI.

**Fig. S6** Photographs of chemical modified SPI film (a) in dry state (50% relative humidity) and (b) in wet state (100% relative humidity).