

Supporting Information

Layer by layer growth of nano porous lead(II) coordination polymer on natural silk fibers and its application in removal and recovery of iodide

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Materials and physical measurements

The silk fibers were supplied by Iran Carpet Company. All reagents and solvents were used as supplied by Merck chemical company and used without further purification. Powder X-ray diffraction (XRD) was carried out on a Philips diffractometer of X'pert Company with mono-chromatized Co-K α radiation. IR spectra were recorded on a SHIMADZU- IR460 spectrometer in a KBr matrix. The samples were characterized with a scanning electron microscope (SEM; Philips XL 30) with gold coating. Ultrasonic generator was carried out on a SONICA-2200 EP, input: 50-60 Hz / 305 W and household microwave at maximum power of 850 W and the UV-Vis was measured with Shimadzu 2100.

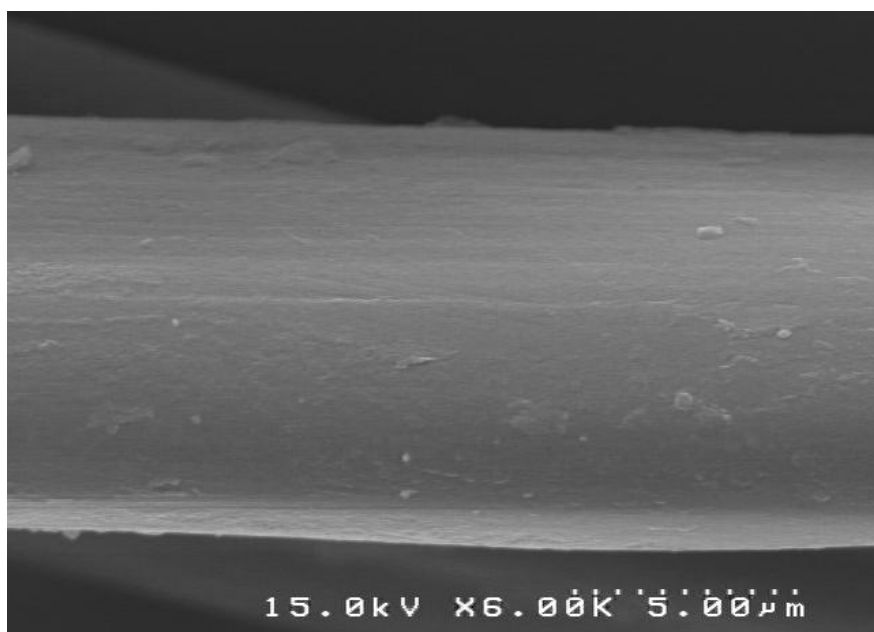
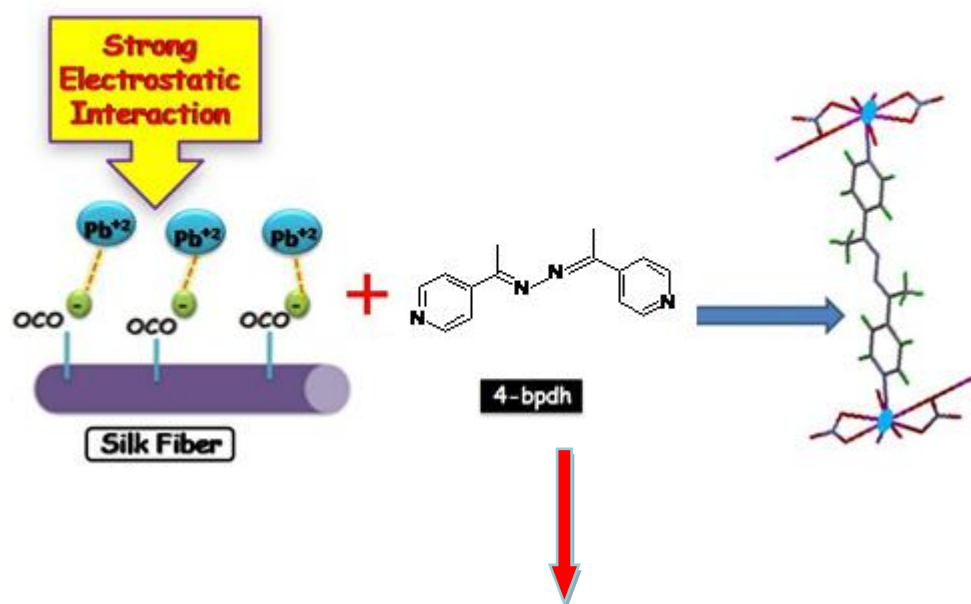
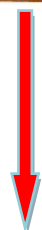
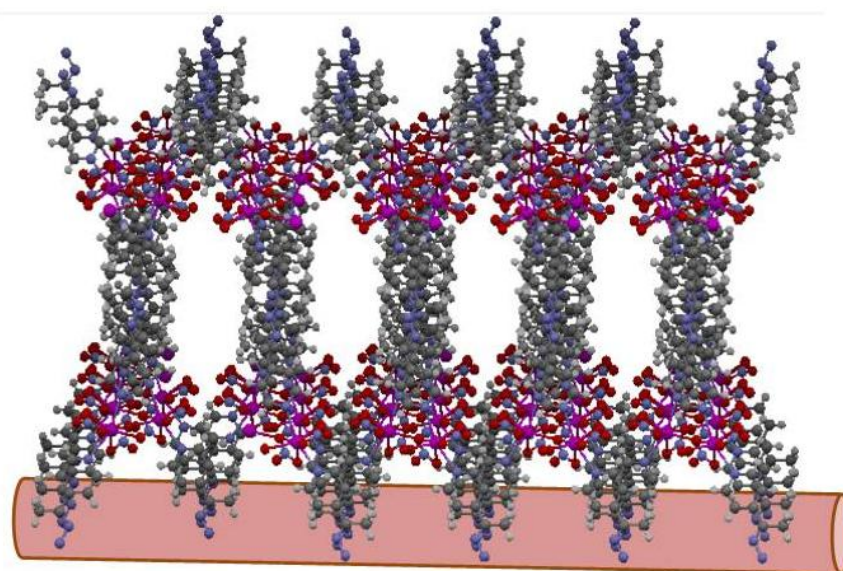
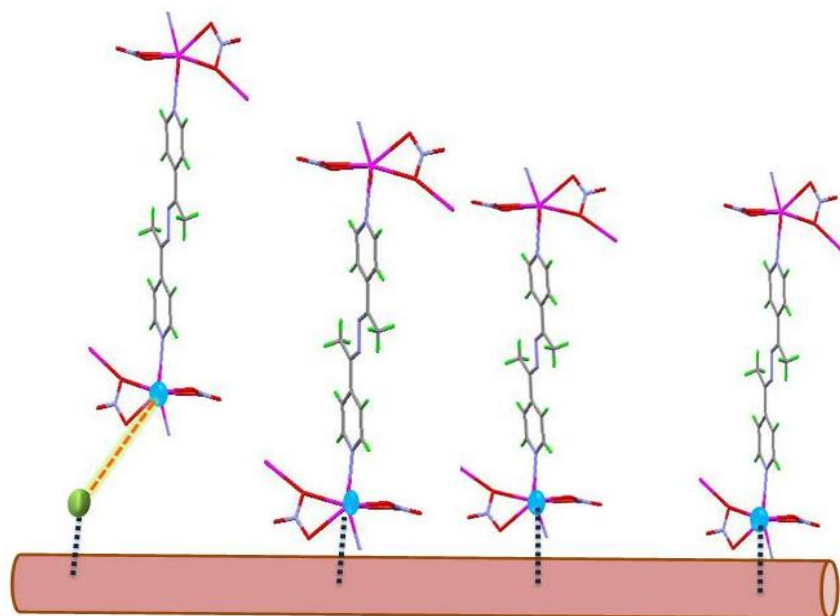


Figure S1. SEM images of the pristine silk yarn.





**Alternate
dipping**

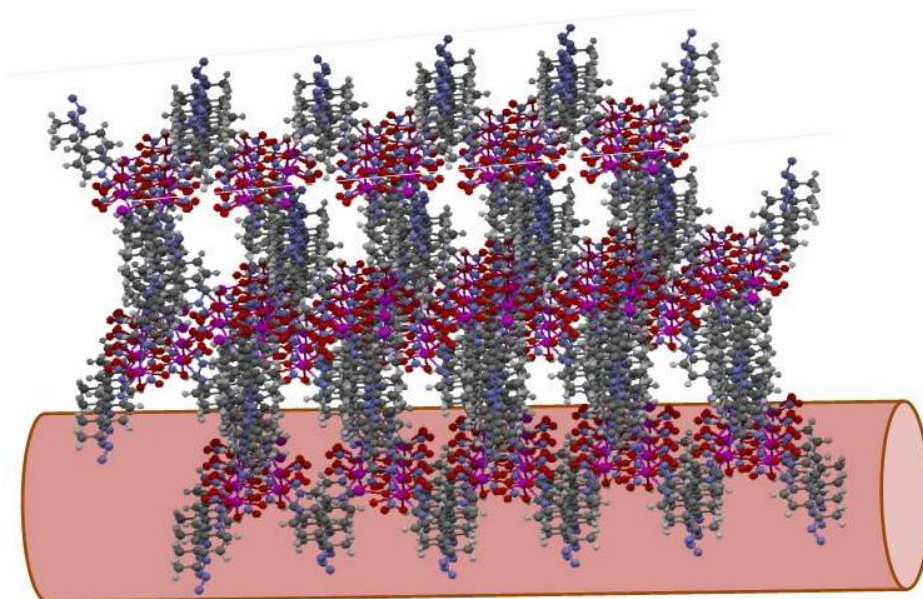
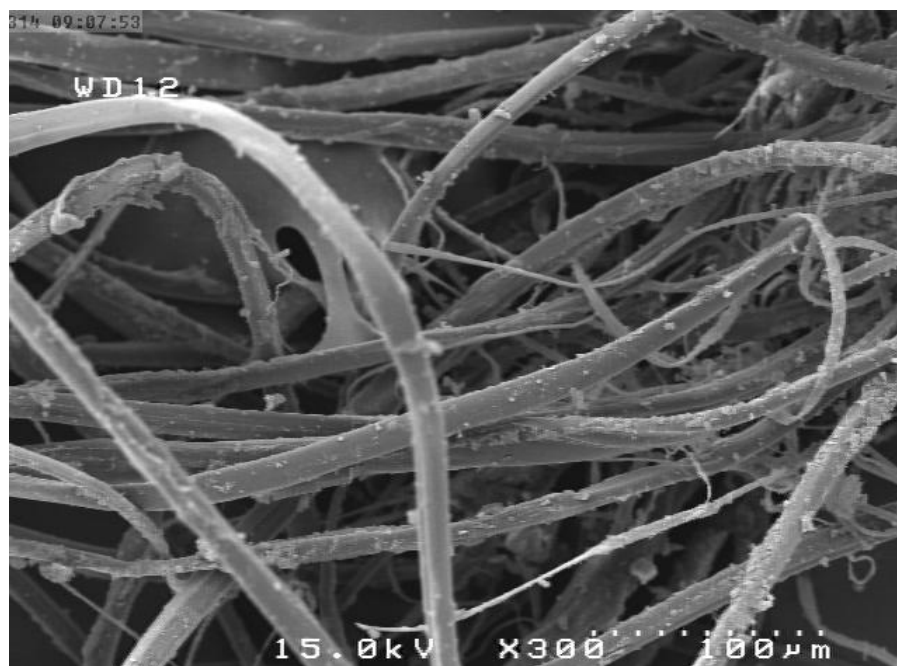


Figure S2. Schematic of the LBL growth of the MOF on the silk surface by repeated immersion cycles, first in solution of metal precursor and subsequently in a solution of organic ligand.



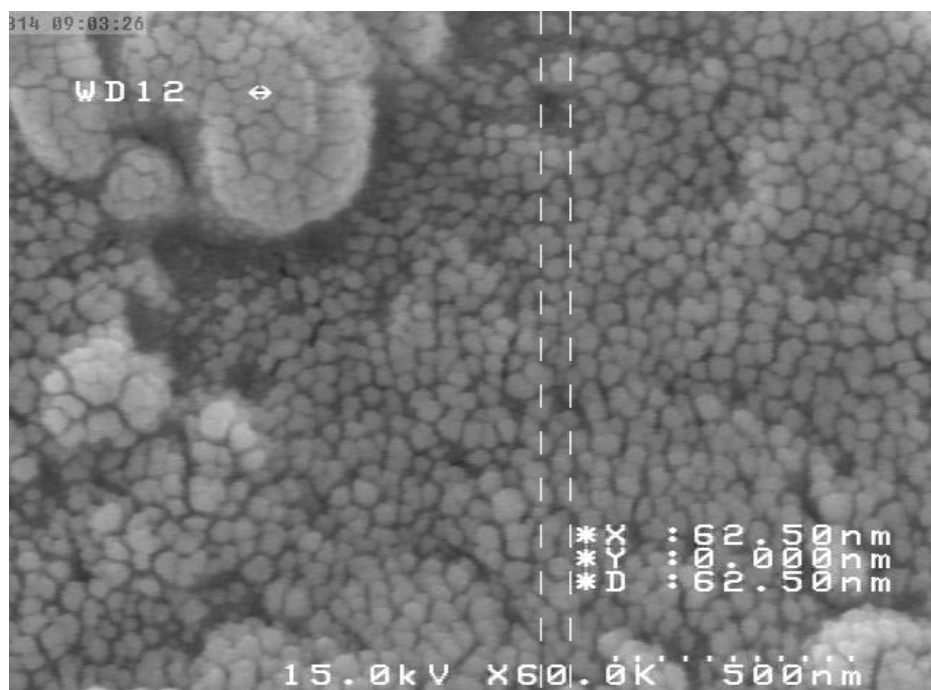


Figure S3. SEM images of the MOF (20 cycles) grown on silk surface without ultrasound and microwave irradiation

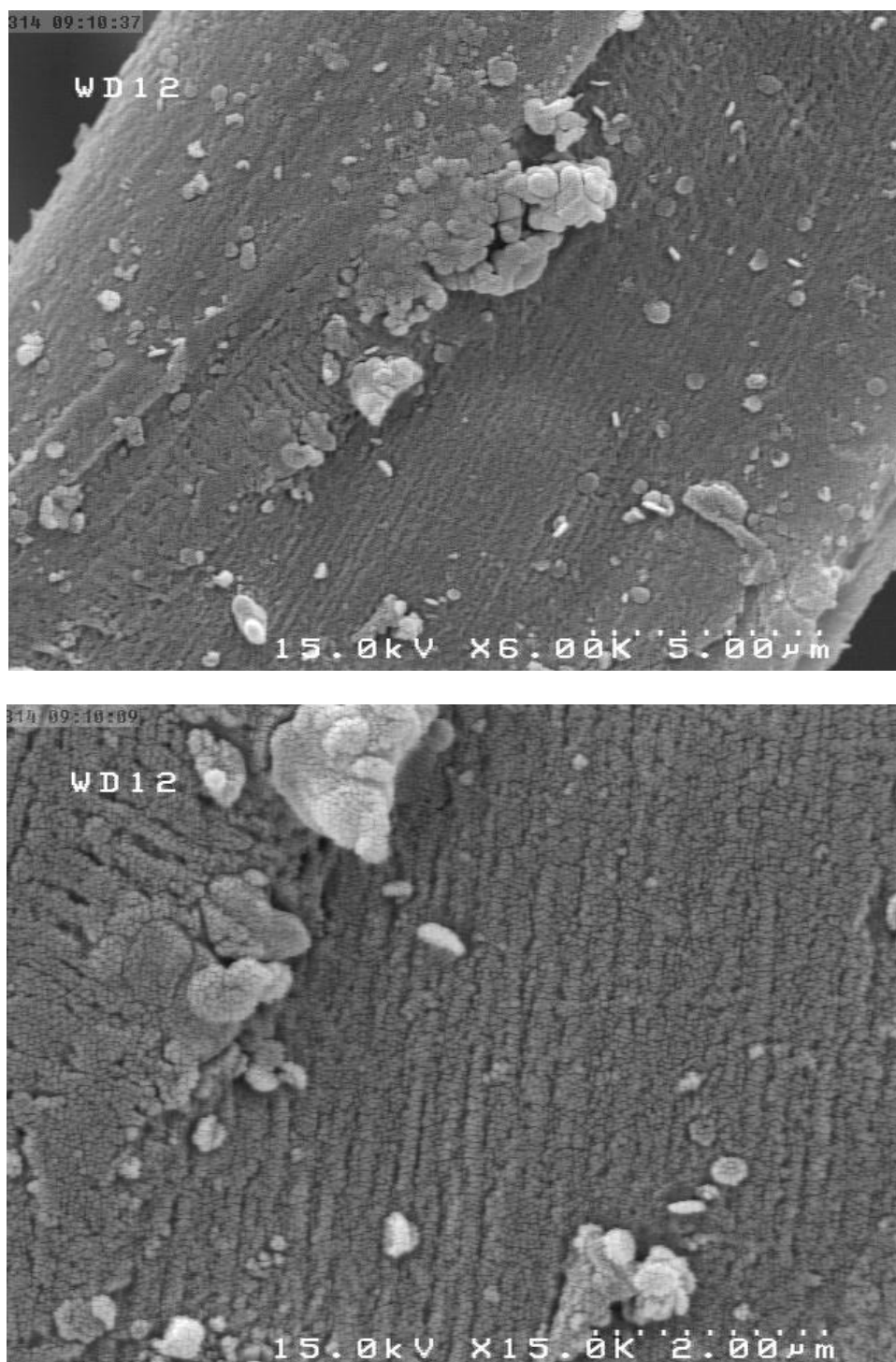


Figure S4. SEM image of MOF deposited onto the silk surface by ultrasonic irradiation

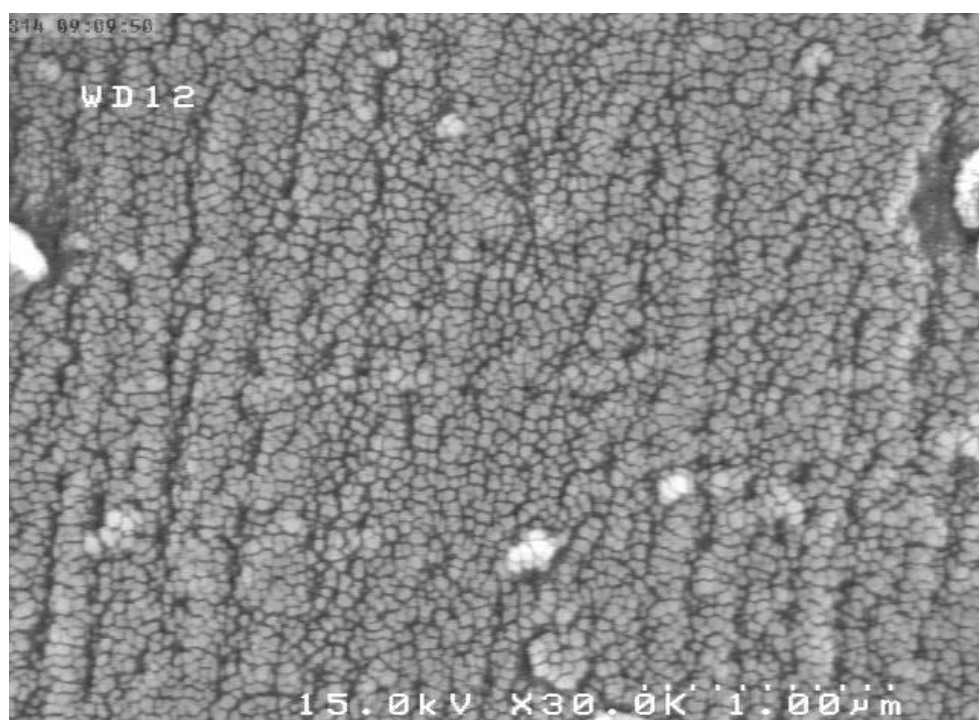
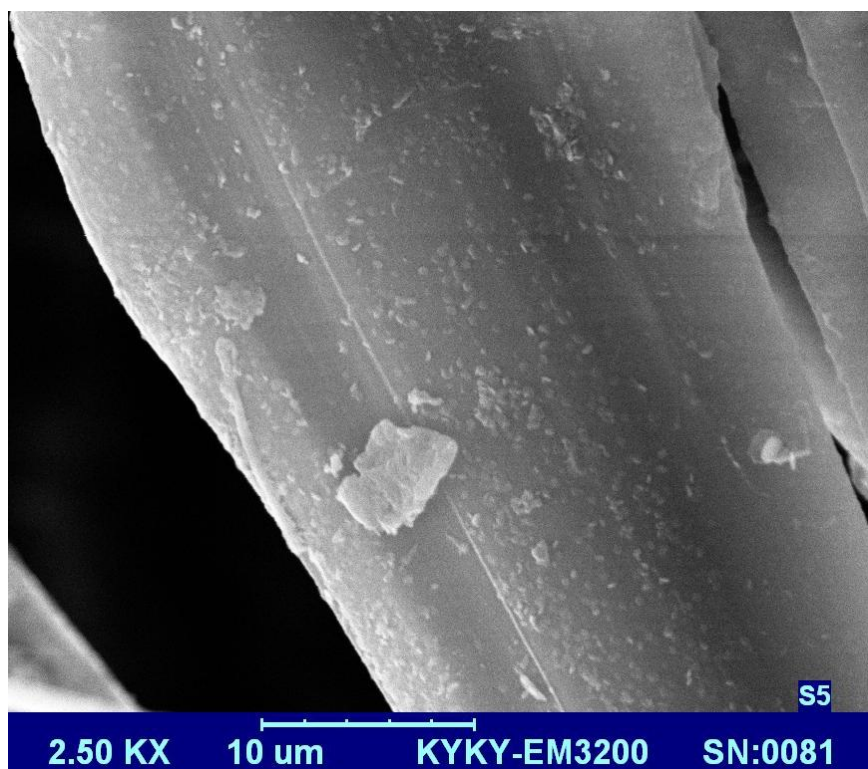


Figure S5. SEM image of MOF deposited onto the silk surface by microwave irradiation

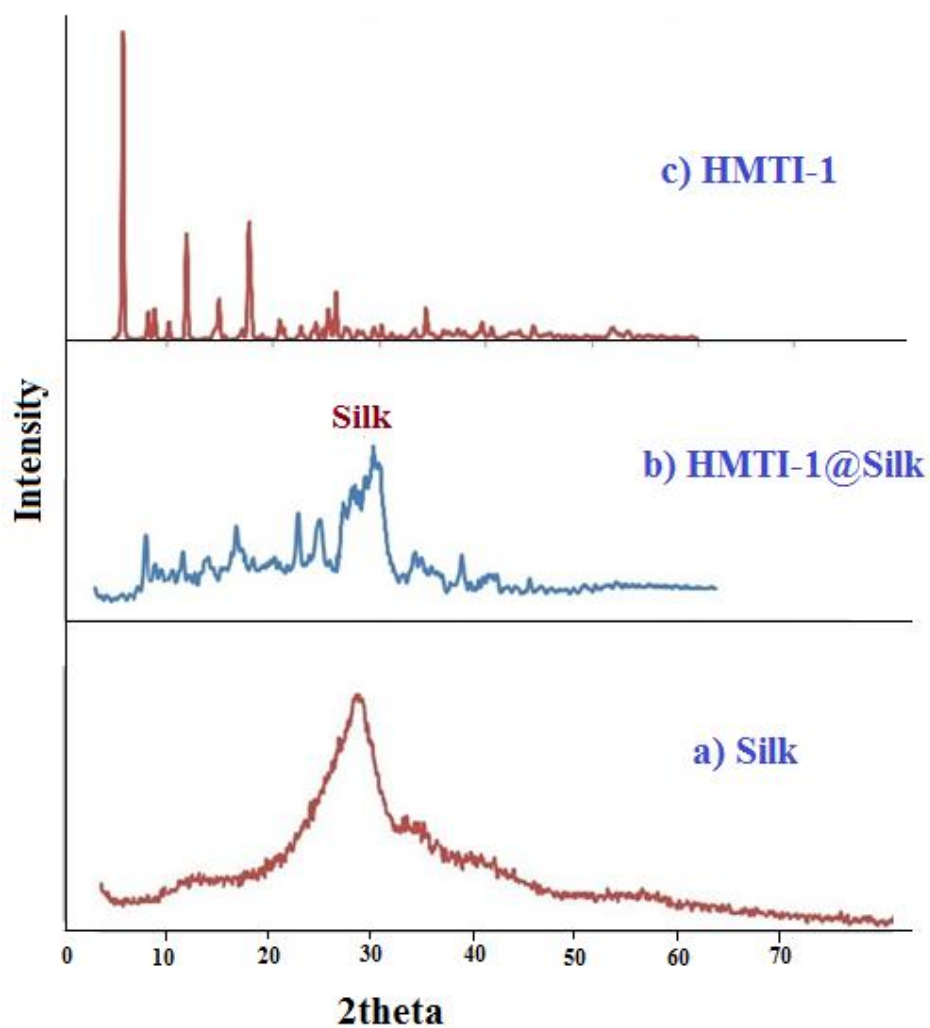


Figure S6. XRD patterns; (a) the pure silk yarn (b), silk yarn containing **HMTI-1** without sonicating (c) as-synthesized **HMTI-1**

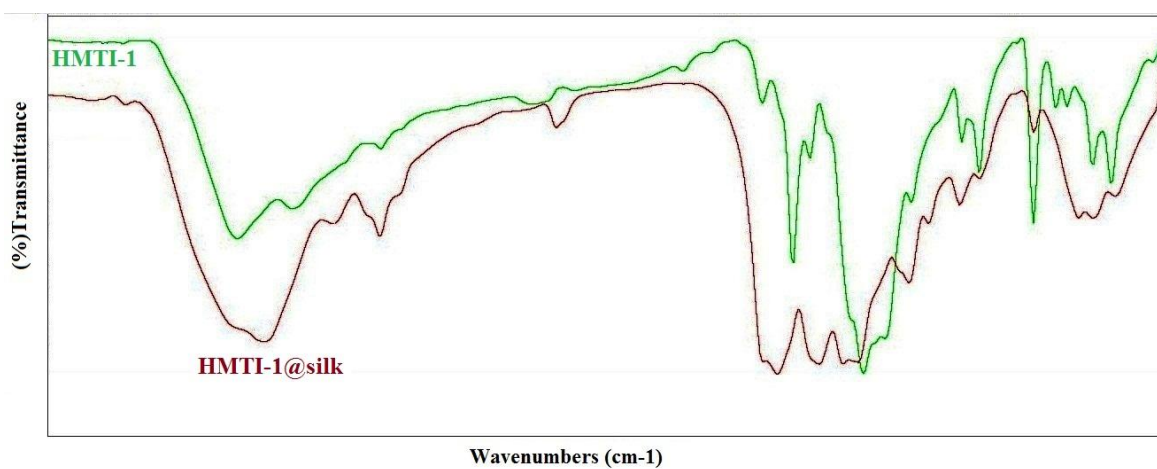


Figure S7. Infrared spectra of **HMTI-1** and **HMTI-1@silk**

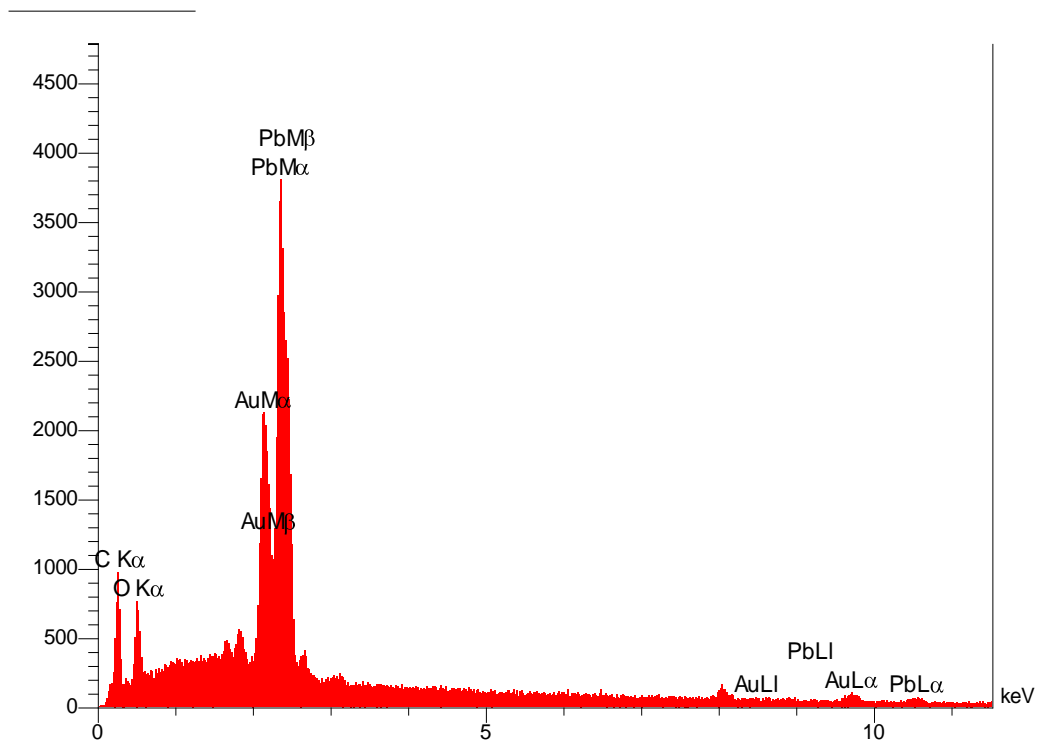


Figure S8. Energy-dispersive X-ray analysis of **HMTI-1@silk**

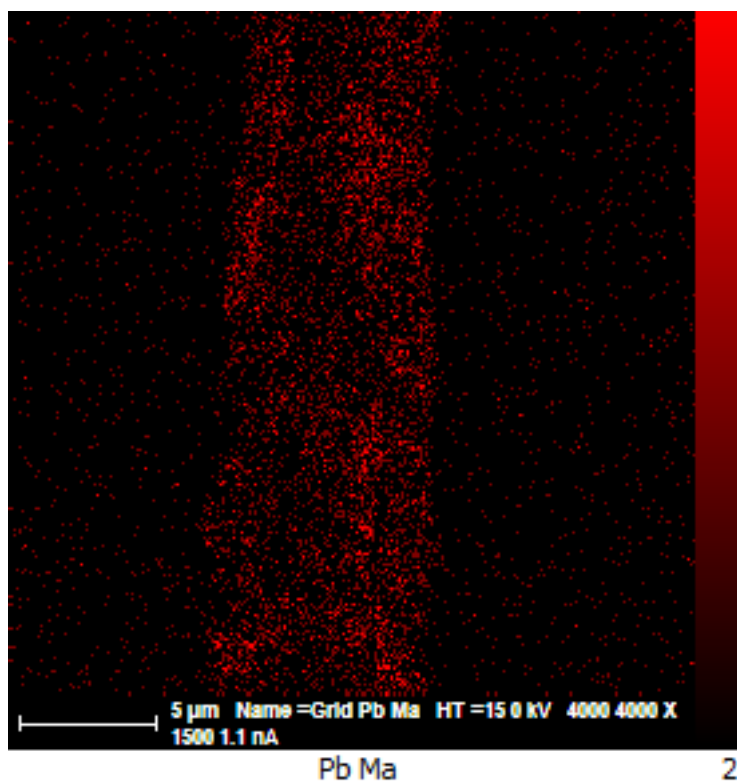


Figure S9. Wavelength-dispersive X-ray (WDS) analysis of **HMTI-1@silk**

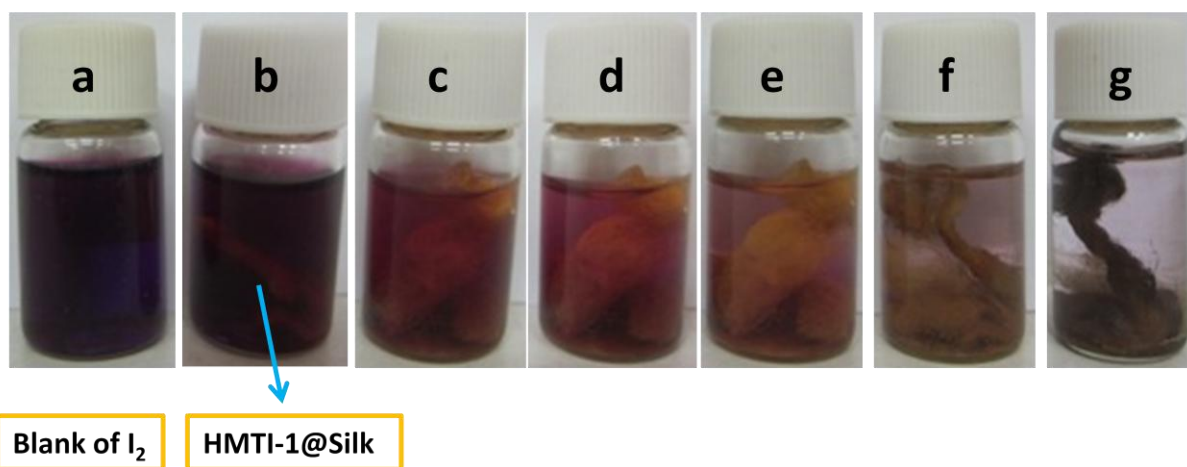


Figure S10. I₂ enrichment progress in a) blank b) immediately c) 3 min, d) 5 min, d) 20 min, e) 30 min and f) 2hour.

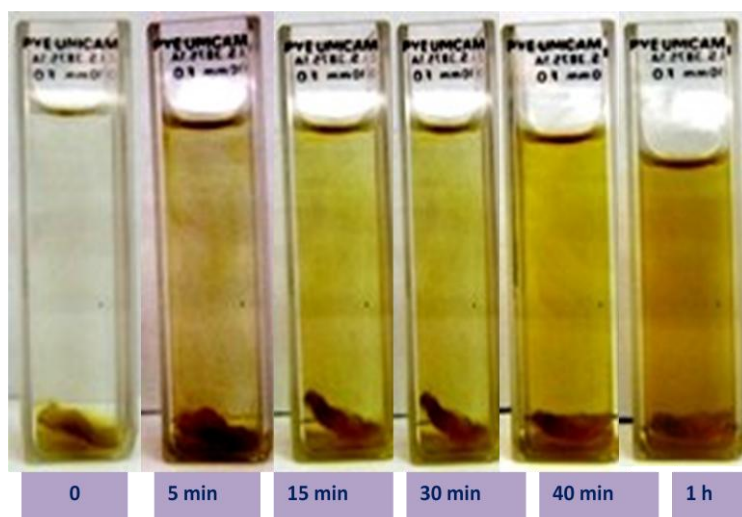


Figure S11. Progress of the iodine release from **HMTI-1@I₂@silk** when were immersed in ethanol

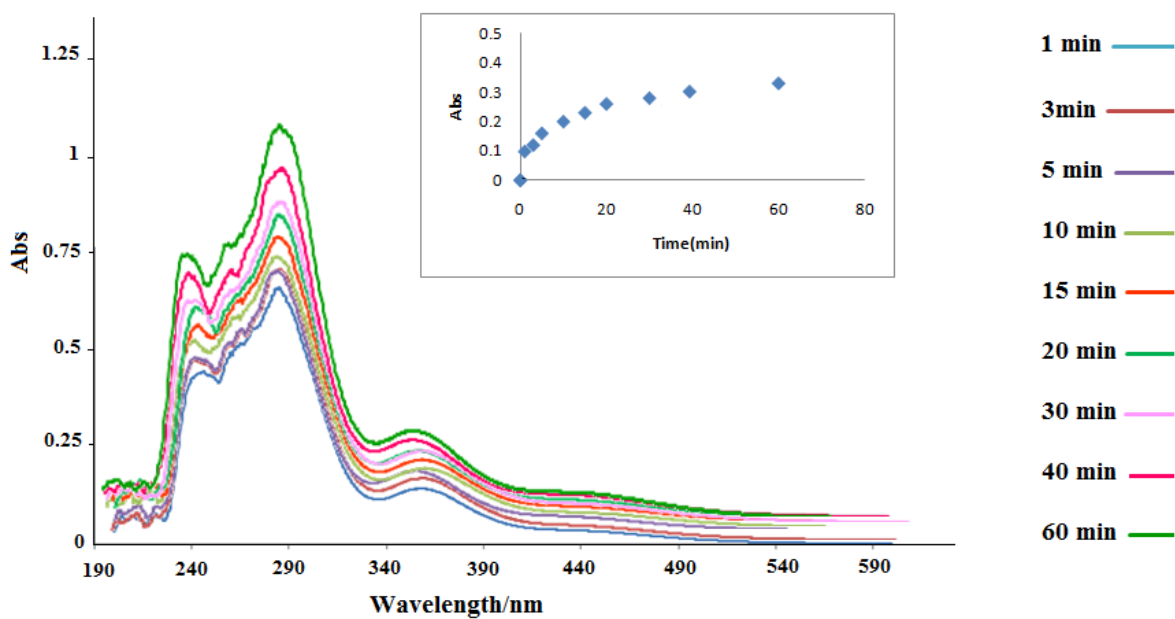


Figure S12. Temporal evolution of UV/vis absorption spectra for the delivery of I₂ from **HMTI-1@I₂@silk** in the 1 h.