Supplementary material

Antimicrobial and biological effects of polyaniline/polyvinylpyrrolidone nanocomposites loaded silver nanospheres/triangles

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1 FTIR analysis of Ag-PANI/PVP nanocomposites

Fourier Transformed Infrared (FTIR) spectra of the nanocomposites were recorded in ATR mode by Thermo Nicolet 380 FTIR Spectrophotometer.

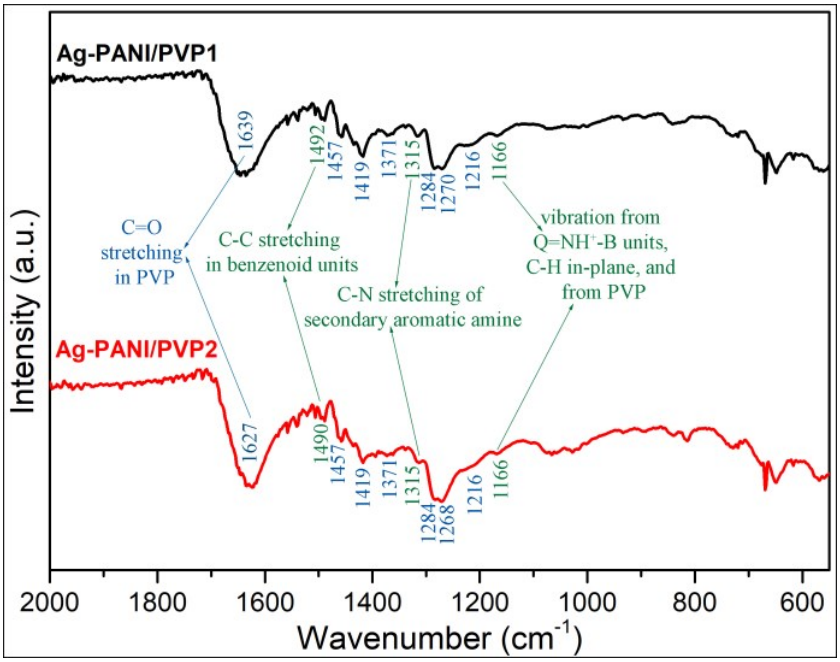

Fig. S1 FTIR spectra of Ag-PANI/PVP1 and Ag-PANI/PVP2 nanocomposites

Table S1 Wavenumbers and assignations of some characteristic vibrations present in FTIR spectra of both nanocomposites[1-8]

Ag-PANI/PVP1 (cm^{-1})	Ag-PANI/PVP2 (cm^{-1})	Assignation
1639	1627	C=O stretching in PVP
1492	1490	PANI- vibration from C–C stretching in B units
1457, 1419 1371 1284 1268, 1216	1457, 1419 1371 1284 1270, 1216	Confirmation of the PVP molecules' existence in both Ag-PANI/PVP nanocomposites
1315	1315	PANI - vibration from C–N stretching of secondary aromatic amine
1166	1166	PANI - vibration from Q=NH+–B units in PANI-ES and C–H in-plane deformation vibration, and/or PVP

2 Antimicrobial activity of Ag-PANI/PVP nanocomposites

Table S2 Antimicrobial activity of Ag-PANI/PVP nanocomposites and pure PANI for *E. coli* (Initial number of colonies = 4.0 x 10^6 CFU/mL).

Sample	Concentration (ppm)	Number of microbial colonies 1 h after their contact with (CFU)	Microbial reduction (%) after 1 h	Number of microbial colonies 2 h after their contact with (CFU)	Microbial reduction (%) after 2 h	Number of microbial colonies 4 h after their contact with (CFU)	Microbial reduction (%) after 4 h
PANI	1	3.8 x 10^6	5.0	3.4 x 10^6	15.0	9.8 x 10^5	75.5
	2	3.3 x 10^6	17.5	3.0 x 10^6	25.0	9.2 x 10^5	77.0
	5	2.4 x 10^6	40.0	2.2 x 10^6	45.0	8.4 x 10^5	79.0
	10	2.1 x 10^6	47.5	1.5 x 10^6	62.5	7.0 x 10^5	82.5
	20	1.5 x 10^6	62.5	1.1 x 10^6	72.5	5.9 x 10^5	85.3
Ag-PANI/PVP 1	1	1.1 x 10^6	72.5	3.4 x 10^5	91.5	2.4 x 10^5	94.0
	2	1.1 x 10^6	72.5	2.9 x 10^5	92.8	2.0 x 10^5	95.0
	5	1.0 x 10^5	97.5	1.0 x 10^5	97.5	6.6 x 10^4	98.4
	10	9.3 x 10^4	97.7	2.4 x 10^3	99.9	8.0 x 10^2	99.9
	20	7.2 x 10^4	98.2	2.0 x 10^3	99.9	<10	99.9
Ag-PANI/PVP 2	1	3.1 x 10^5	92.3	2.8 x 10^5	93.0	1.4 x 10^5	96.5
	2	1.6 x 10^5	96.0	1.0 x 10^5	97.5	4.7 x 10^4	98.8
	5	7.2 x 10^4	98.2	6.8 x 10^4	98.3	5.7 x 10^3	99.9
	10	5.2 x 10^4	98.7	2.0 x 10^3	99.9	<10	99.9
	20	4.1 x 10^4	99.0	1.2 x 10^3	99.9	<10	99.9

Table S3 Antimicrobial activity of Ag-PANI/PVP nanocomposites and pure PANI for *S. aureus* (Initial number of colonies = 5.7 x 10^6 CFU/mL).

Sample	Concentration (ppm)	Number of microbial colonies 1 h after their contact with (CFU)	Microbial reduction (%) after 1 h	Number of microbial colonies 2 h after their contact with (CFU)	Microbial reduction (%) after 2 h	Number of microbial colonies 4 h after their contact with (CFU)	Microbial reduction (%) after 4 h
PANI	1	5.1 x 10^6	10.5	4.7 x 10^6	17.5	4.3 x 10^6	24.5
	2	5.0 x 10^6	12.3	4.6 x 10^6	19.3	4.2 x 10^6	26.3
	5	4.8 x 10^6	15.8	4.0 x 10^6	29.8	3.9 x 10^6	31.6
	10	4.8 x 10^6	15.8	3.8 x 10^6	33.3	3.6 x 10^6	36.8
	20	4.8 x 10^6	15.8	2.9 x 10^6	49.1	2.2 x 10^6	61.4
Ag-PANI/PVP 1	1	2.6 x 10^6	54.4	2.0 x 10^6	64.9	1.2 x 10^6	78.9
	2	2.5 x 10^6	56.1	1.2 x 10^6	78.9	1.0 x 10^6	82.5
	5	2.2 x 10^6	61.4	9.8 x 10^5	82.8	9.2 x 10^5	83.9
	10	2.1 x 10^6	63.2	8.6 x 10^5	84.9	1.2 x 10^5	97.9
	20	2.0 x 10^6	64.9	6.6 x 10^5	88.4	7.2 x 10^4	98.7
Ag-PANI/PVP 2	1	2.0 x 10^6	64.9	1.8 x 10^6	68.4	1.1 x 10^6	80.7
	2	1.9 x 10^6	66.7	6.1 x 10^5	89.3	4.4 x 10^5	92.3
	5	1.9 x 10^6	66.7	3.5 x 10^5	93.8	2.9 x 10^5	94.9
	10	1.3 x 10^6	77.2	2.7 x 10^5	95.2	8.0 x 10^4	98.6
	20	1.2 x 10^6	78.9	1.1 x 10^5	98.0	4.8 x 10^4	99.2

Table S4 Antimicrobial activity of Ag-PANI/PVP nanocomposites and pure PANI for *C. albicans* (Initial number of colonies = 1.8 x 10^6 CFU/mL).

Sample	Concentration (ppm)	Number of microbial colonies 1 h after their contact with (CFU)	Microbial reduction (%) after 1 h	Number of microbial colonies 2 h after their contact with (CFU)	Microbial reduction (%) after 2 h	Number of microbial colonies 4 h after their contact with (CFU)	Microbial reduction (%) after 4 h
PANI	1	1.8 x 10^6	1.7	1.8 x 10^6	1.7	1.5 x 10^6	16.7
	2	1.7 x 10^6	5.5	1.6 x 10^6	11.1	1.3 x 10^6	27.7
	5	1.7 x 10^6	5.5	1.5 x 10^6	16.7	1.3 x 10^6	27.7
	10	1.6 x 10^6	11.1	1.4 x 10^6	22.2	1.2 x 10^6	33.3
	20	1.5 x 10^6	16.7	1.4 x 10^6	22.2	1.2 x 10^6	33.3
Ag-PANI/PVP 1	1	1.3 x 10^6	27.7	1.0 x 10^6	44.4	8.9 x 10^5	50.1
	2	1.2 x 10^6	33.3	1.0 x 10^6	44.4	7.3 x 10^5	59.4
	5	1.1 x 10^6	38.9	9.5 x 10^5	47.2	7.2 x 10^5	60.0
	10	1.0 x 10^6	44.4	8.7 x 10^5	51.6	2.1 x 10^5	88.3
	20	8.0 x 10^5	55.6	5.8 x 10^5	67.8	1.9 x 10^5	89.4
Ag-PANI/PVP 2	1	1.2 x 10^6	33.3	9.8 x 10^5	45.6	6.5 x 10^5	63.9
	2	1.1 x 10^6	38.9	8.9 x 10^5	50.1	6.1 x 10^5	66.1
	5	1.0 x 10^6	44.4	7.8 x 10^5	56.6	5.2 x 10^5	71.1
	10	8.8 x 10^5	51.2	6.6 x 10^5	63.3	1.9 x 10^5	89.4
	20	7.3 x 10^5	59.4	5.2 x 10^5	71.1	1.6 x 10^5	91.1

3 Silver ions release

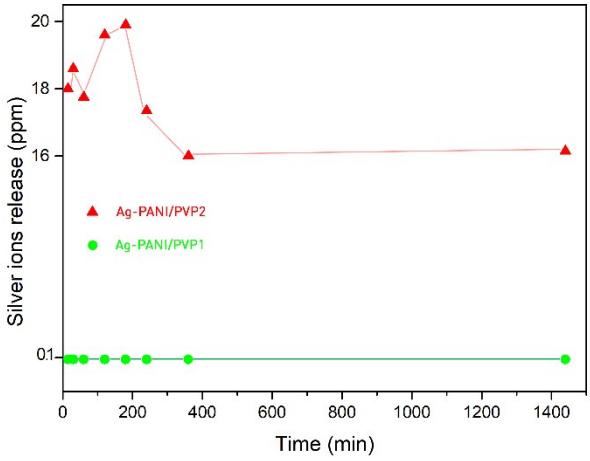

Fig. S2 Silver ions release from Ag-PANI/PVP1 and Ag-PANI/PVP2 nanocomposites

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