

Supporting Information

Preparation, Characterization and Scanned Conductance Microscopy Studies of DNA-Templated One-Dimensional Copper Nanostructures

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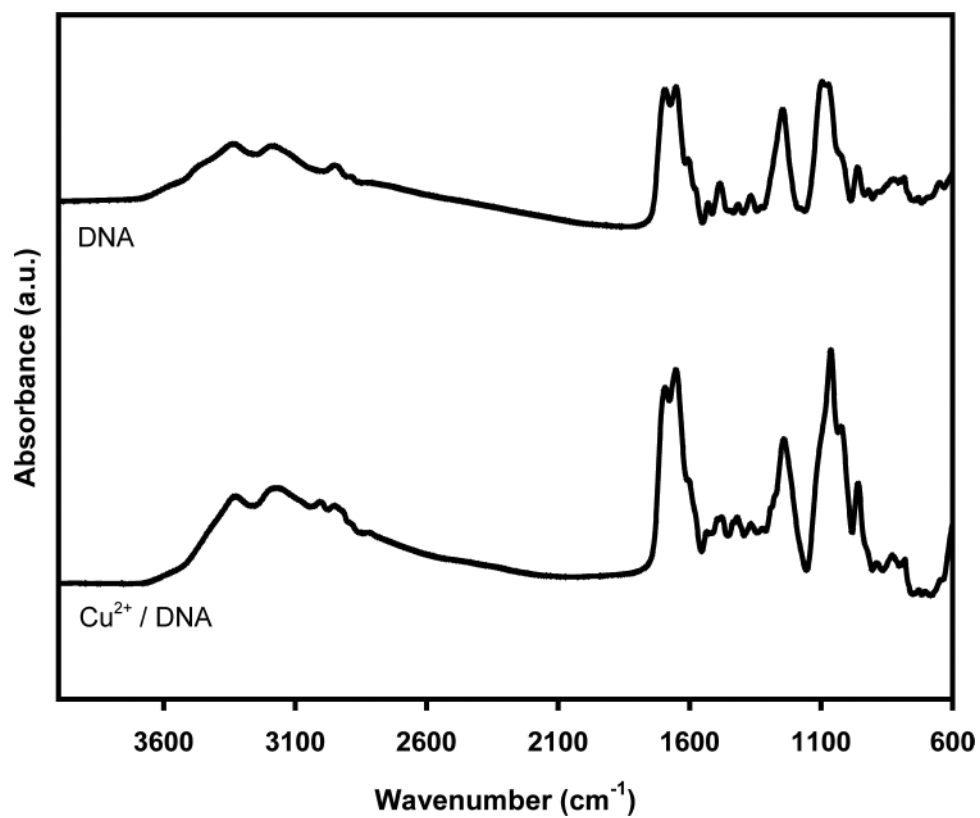


Figure S1. shows the FTIR spectra of free DNA vs the Cu²⁺/DNA complex in the 600–4000 cm⁻¹ region.

Table S1. Assignment and comparison of bands in FTIR spectra (600–1800 cm^{-1}) of free DNA and Cu^{2+} /DNA complex.

DNA	Wavenumber (cm^{-1})	Assignment ^a	Cu^{2+} / DNA	Wavenumber (cm^{-1})	Assignment ^a
	961	C-C deoxyribose stretch		961	C-C deoxyribose stretch
	1024	C-O deoxyribose stretch		1024	C-O deoxyribose stretch
	1074	P-O or C-O backbone stretch		1063	P-O or C-O backbone stretch
	1096	PO_2^- symmetric stretch		-	-
	1248	PO_2^- assymmetric stretch		1242	PO_2^- assymmetric stretch
	-	-		1277	PO_2^- assymmetric stretch ^b
	1327	C-N stretch of adenine		1322	C-N stretch of adenine
	1368	C-N stretch of guanine and cytosine		1366	C-N stretch of guanine and cytosine
	1416	C-H, N-H deformation ; C-N stretch of thymine, guanine and cytosine		1419	C-H, N-H deformation ; C-N stretch of thymine, guanine and cytosine
	1485	C8-N coupled with a ring vibration of guanine		1477	C8-N coupled with a ring vibration of guanine
	1530	In-plane vibration of guanine and cytosine		1535	In-plane vibration of cytosine and guanine
	1577	C=N guanine and adenine stretch		1584	C=N guanine and adenine stretch
	1607	C=N cytosine; N-H adenine; C7=N adenine		1600	C=N cytosine, N-H adenine, C7=N adenine

1652	C2=O stretch of cytosine; In-plane vibrations of adenine, thymine and guanine.	1652	C2=O stretch of cytosine; In-plane vibrations of adenine, thymine and guanine.
1693	C2=O stretch of guanine; N-H thymine; Adenine vibration	1694	C2=O stretch of guanine; N-H thymine; Adenine vibration
2850 - 3200	C-H, N-H stretch	2850 - 3200	C-H, N-H stretch
3500	OH stretch	3500	OH stretch

^a Assignments of DNA vibration bands reference to (1), (2), (3) and (4)

^b Peak appeared as a shoulder

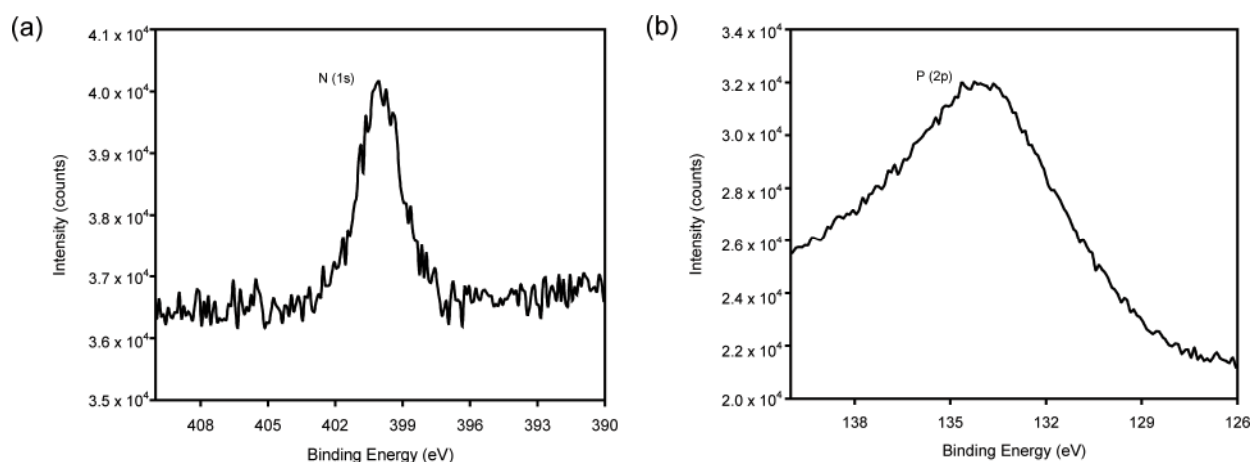


Figure S2. XPS spectra of (a) N(1s) and (b) P(2p) regions of λ -DNA immobilised upon a Si/SiO₂ substrate, followed by solution treatments in Cu(NO₃)₂ and ascorbic acid. The N(1s) and P(2p) arising from the nucleobases and phosphate backbone respectively, confirm the presence of DNA in the prepared Cu⁰ nanostructures. The P(2p) peak position coincides with a plasmon loss peak of Si (arising from the substrate), so although the P(2p) peak can be identified it should be noted that it is superimposed upon this pronounced Si loss peak.

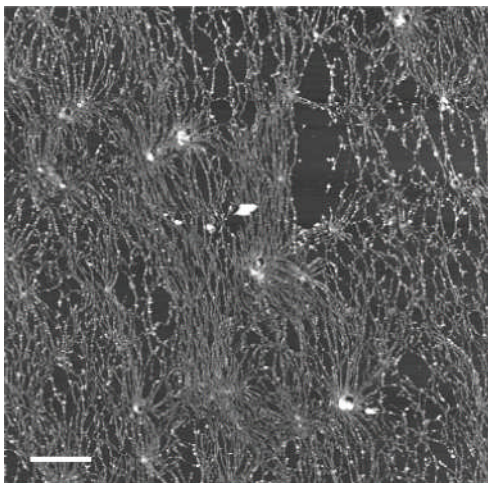


Figure S3. TappingMode AFM height image of dense network of Cu^0 -coated λ -DNA, immobilized upon a Si/SiO₂ substrate, used in XPS studies. Scale bar = 1 μm , height scale = 15 nm.

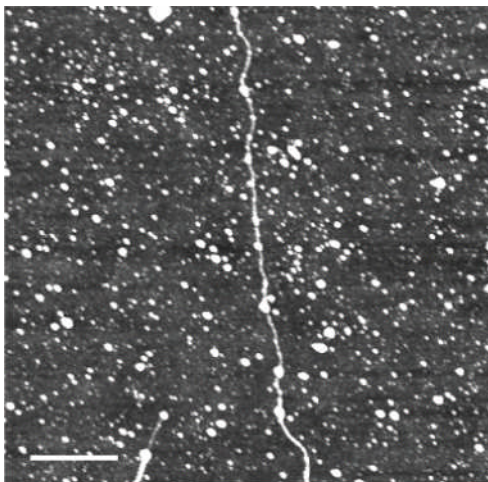


Figure S4. TappingMode AFM height image of a Cu^0 -coated λ -DNA molecule from which SCM data was obtained, as shown in Figure 7. Scale bar = 500 nm, height scale = 5 nm.

References

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