

Supplementary information for

Lethal weapon II: A nano-copper/tetraalkylphosphonium ionic liquid composite material with potent antibacterial activity

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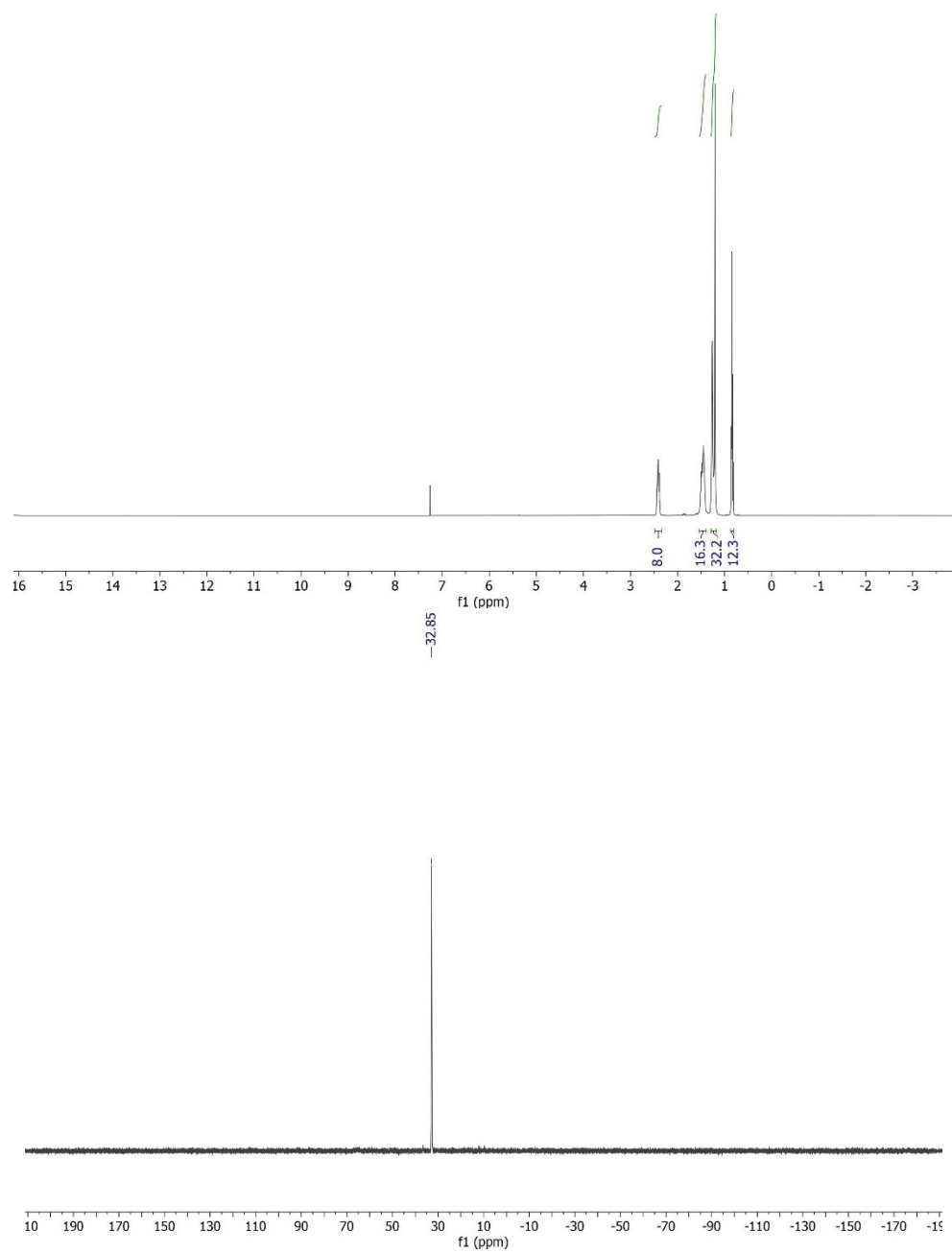


Fig S1. 1H and ^{31}P NMR spectra of TAPIL-1, $[P(C_6H_{13})_3(C_{14}H_{29})]Cl$

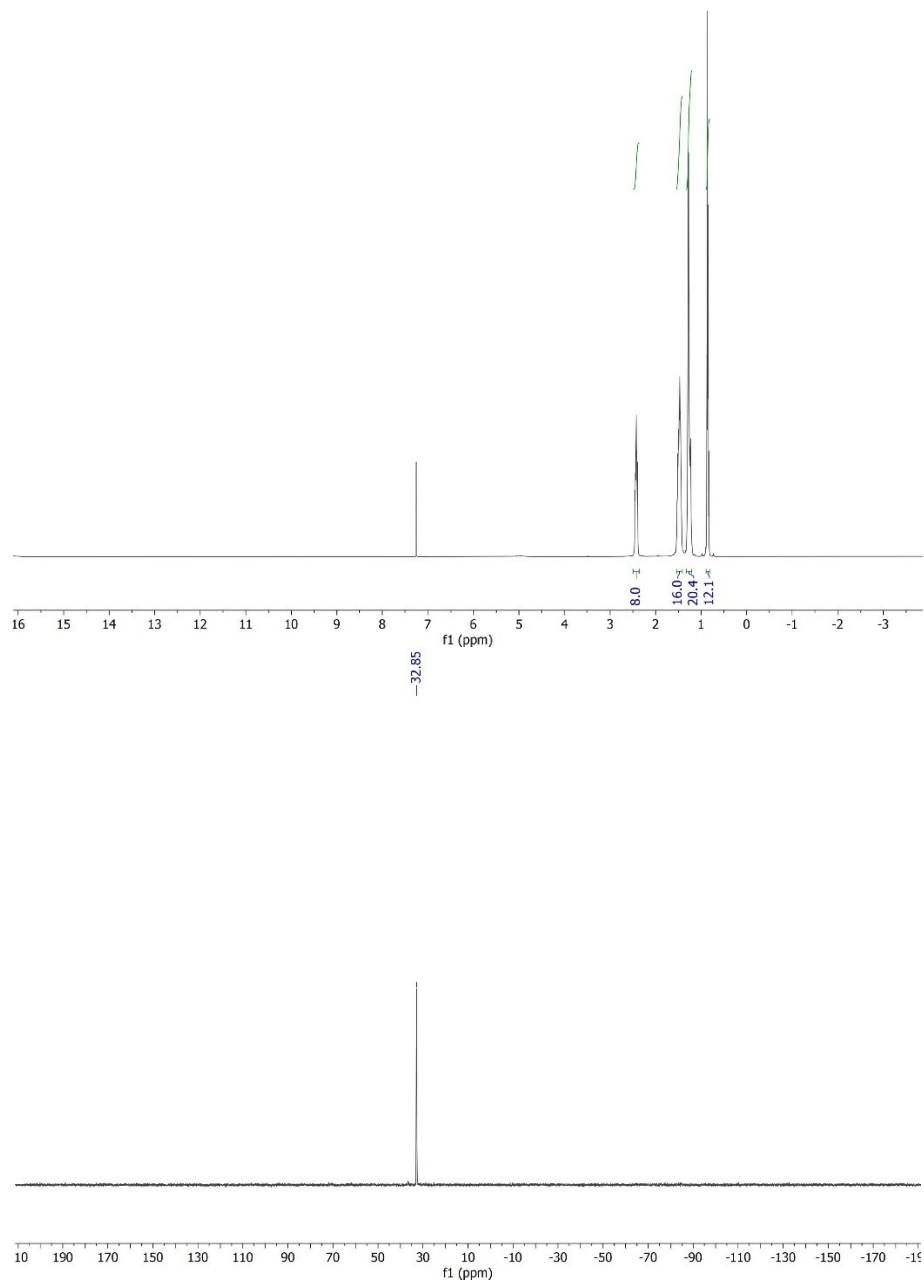


Fig S2. 1H and ^{31}P NMR spectra of TAPIL-2, $[P(C_6H_{13})_3(C_8H_{17})]Cl$

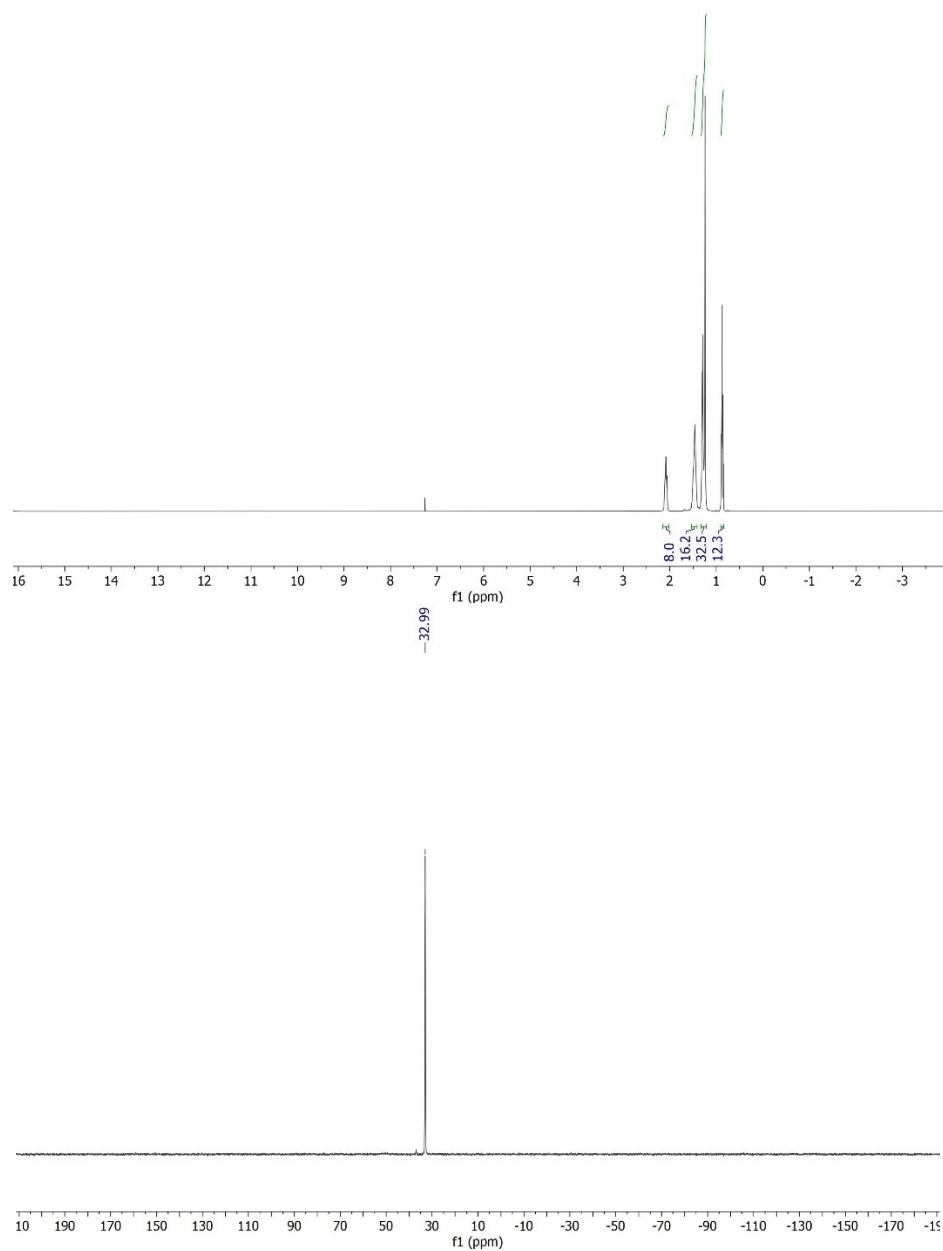


Fig S3. ^1H and ^{31}P NMR spectra of TAPIL-3, $[\text{P}(\text{C}_6\text{H}_{13})_3(\text{C}_{14}\text{H}_{29})]\text{NTf}_2$

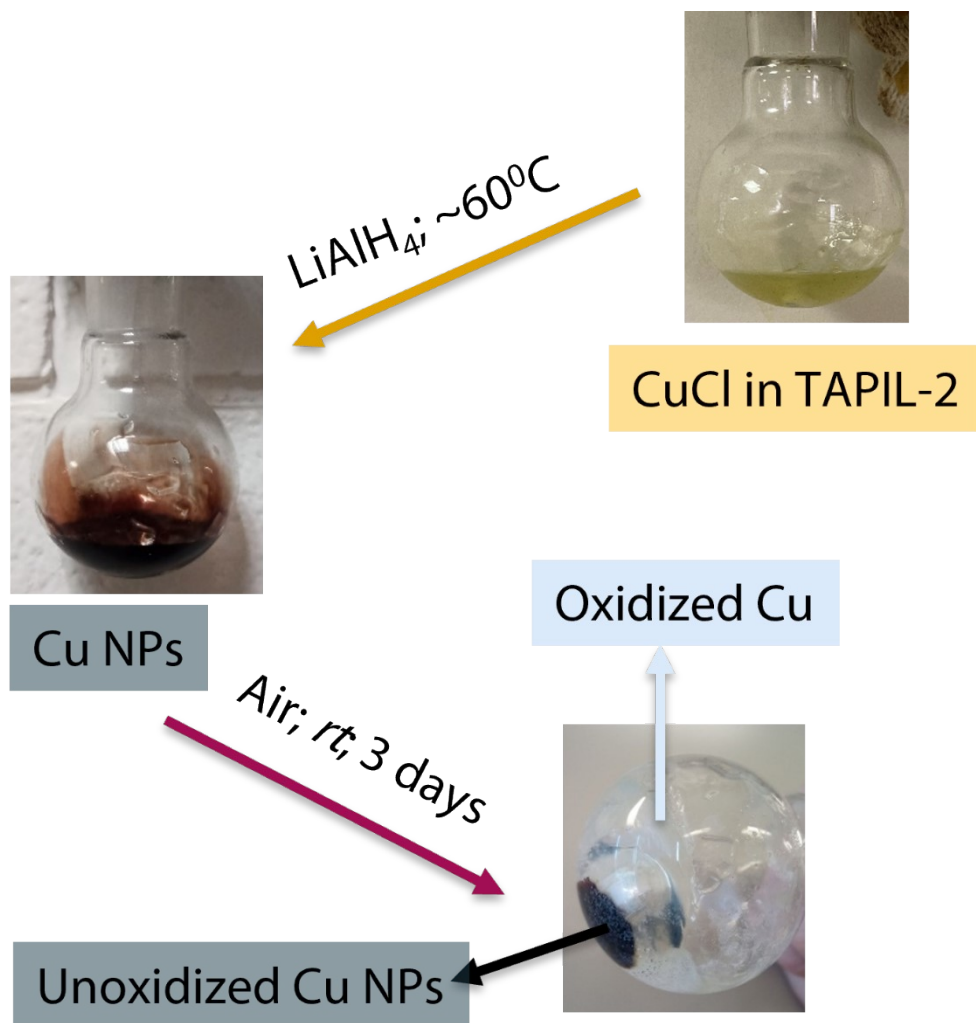


Fig S4. Evolution of copper species within **composite-2**: visual inspection.

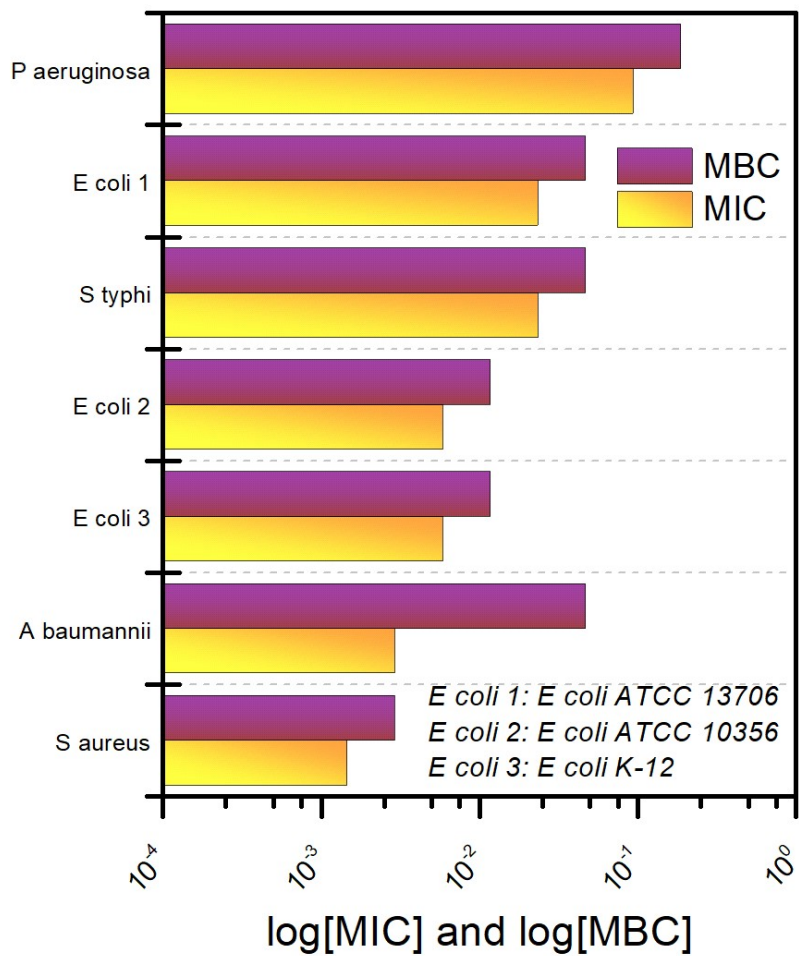


Fig S5. Bacterial panel test results for **composite-2** plotted on a log scale; MIC and MBC are in units of $\mu\text{g.mL}^{-1}$.

Table S1. Time kill assay of *E. coli* and *S. aureus* upon exposure to **composite-2**.

<i>E. coli</i>	Log of mean viable cells			Log of reduction (cfu/mL)			
Time (min)	1-Fold	2-Fold	4-Fold	LogN	1-Fold	2-Fold	4-Fold
0	4.69	4.95	4.86	7.32	2.63	2.37	2.46
10	4.58	4.37	4.02	7.32	2.74	2.95	3.30
20	4.33	4.27	3.92	7.32	2.99	3.05	3.40
30	4.24	4.22	3.78	7.32	3.08	3.10	3.54
60	4.16	4.05	3.59	7.32	3.16	3.27	3.73
90	3.97	4.01	3.53	7.32	3.35	3.31	3.79
120	3.86	3.91	3.44	7.32	3.46	3.41	3.88

<i>S. aureus</i>	Log of mean viable cells			Log of reduction (cfu/mL)			
Time (min)	1-Fold	2-Fold	4-Fold	LogN	1-Fold	2-Fold	4-Fold
0	5.43	5.33	6.23	7.43	2.00	2.10	1.20
10	5.29	5.22	6.05	7.43	2.14	2.21	1.38
20	5.17	5.09	5.95	7.43	2.26	2.34	1.48
30	4.96	4.91	5.73	7.43	2.47	2.52	1.70
60	4.92	4.85	5.19	7.43	2.51	2.58	2.24
90	4.88	4.85	4.41	7.43	2.55	2.58	3.02
120	4.83	4.83	4.14	7.43	2.60	2.60	3.29

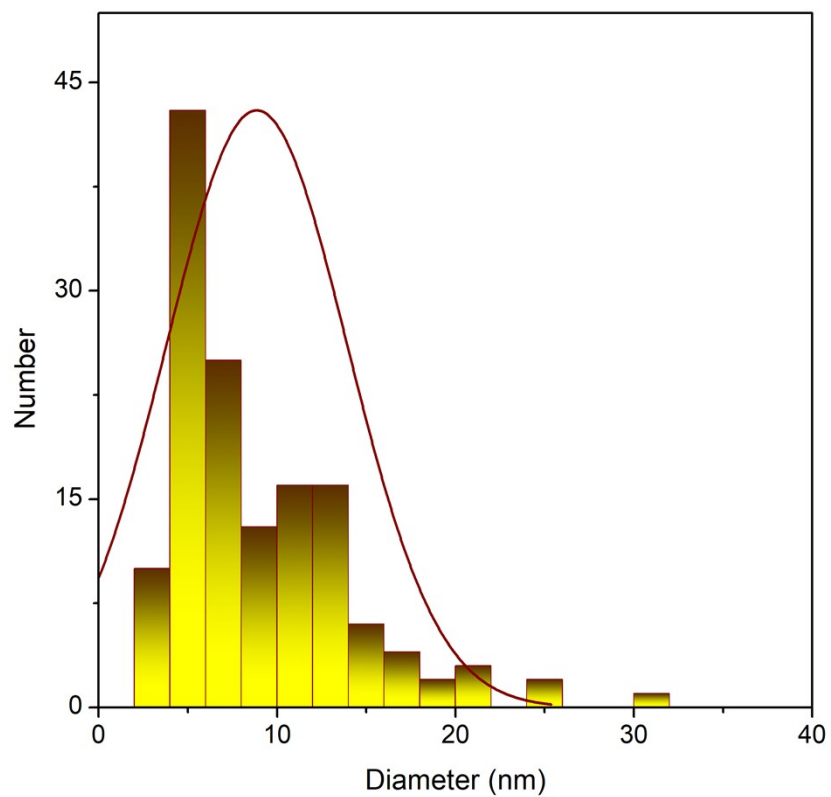


Fig S6. Cu NP size distribution profile associated with **Fig. 4(d)**. Rationale for $r(\text{Cu NP})_{\text{SEM}} \gg r(\text{Cu NP})_{\text{TEM}}$ may be found in Section 3b of the main paper.

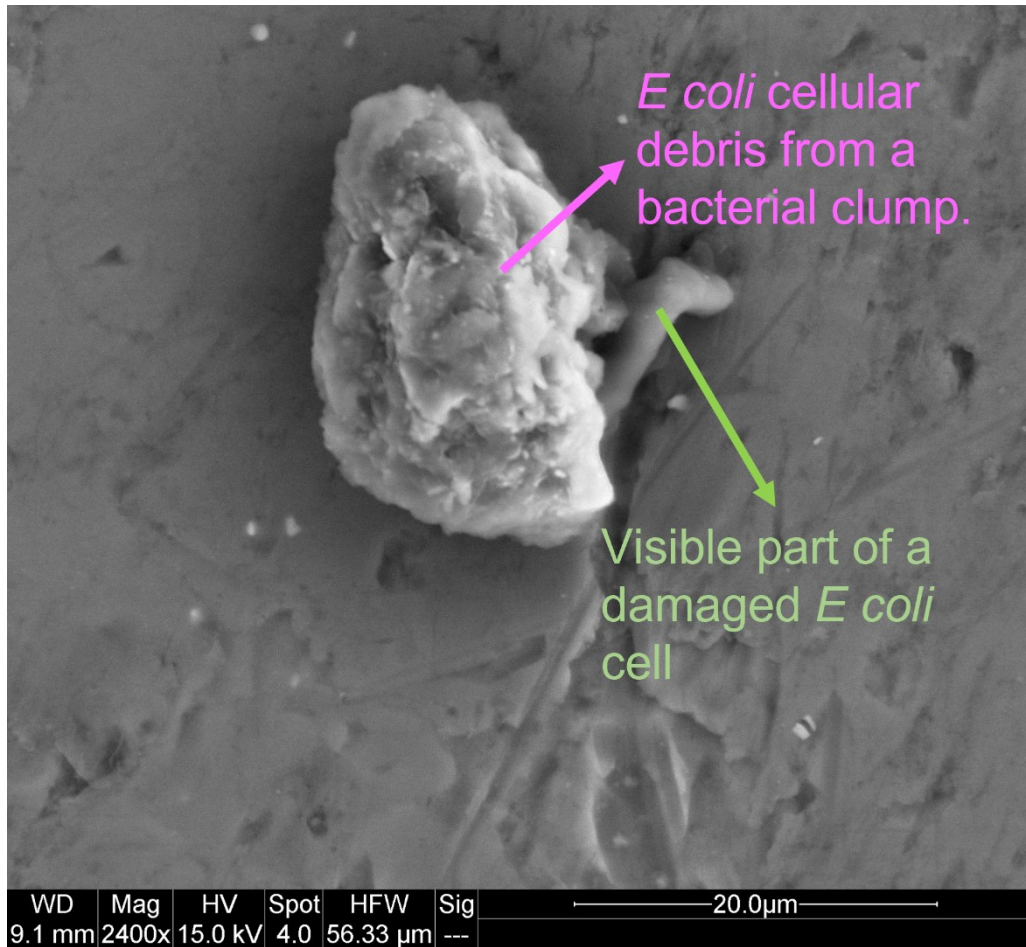


Fig S7. The full-sized version of the cropped inset in **Fig. 9(d)** of the main text.