Electronic Supplementary Material (ESI) for ChemComm.


# Supplementary Information

## Controlled and sustained release of pharmaceuticals via a single step solvent-free encapsulation

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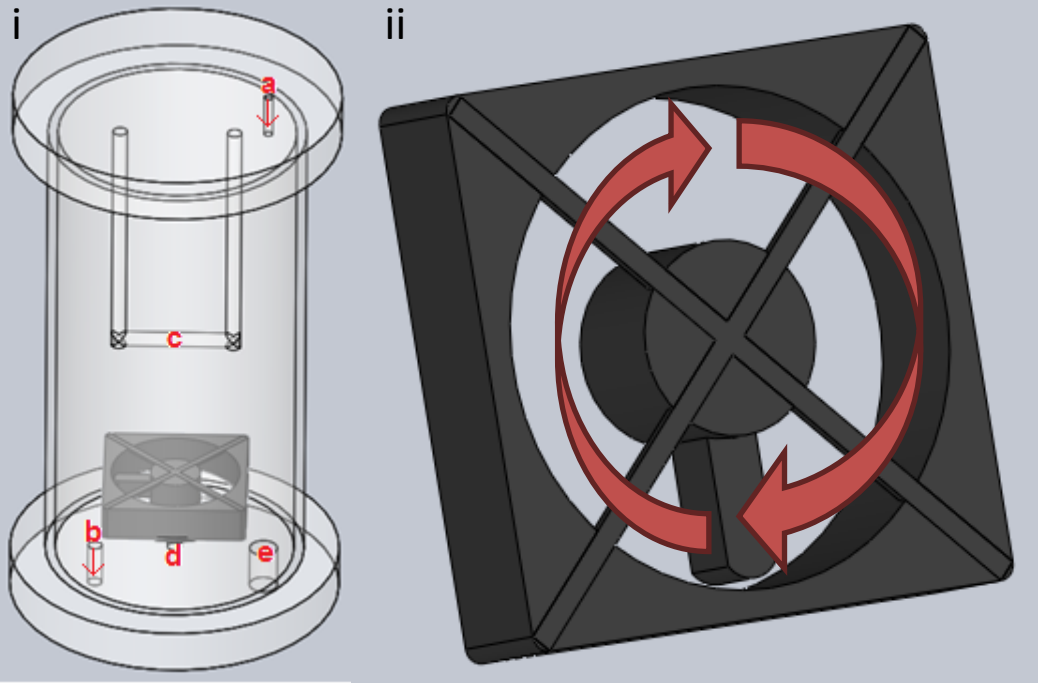


FIG. S1. i) Schematic of plasma reactor setup with additional DC power input and off–centre weighted motor for inducing shaking motion a) monomer inlet b) monomer outlet c) RF cathode d) RF anode with attached motor e) DC power in port. ii) Schematic of shaking motor.

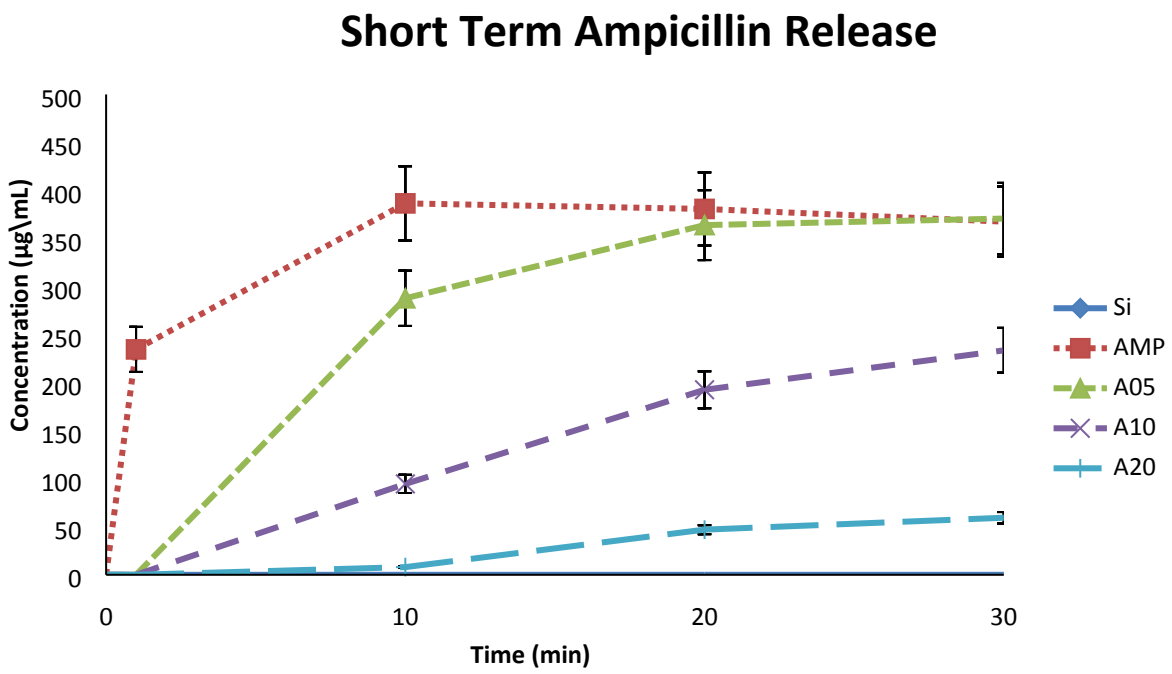


FIG. S2. Initial ampicillin release over 30 minutes. Total ampicillin release rates over 5 day period. Where release of ampicillin into filtered water from coated and uncoated ampicillin powder based on UV-vis absorbance where AMP (■ ), A05 (▲ ), A10 (**X**), and A20 (+) (uncoated ampicillin and ampicillin with 5, 10 and 20 minute plasma polymerized octadiene coatings respectively) showed different release rates depending on polymerisation time. Si powder coated with octadiene (♦) was used as a control. All error assumes a ±10% deviation.

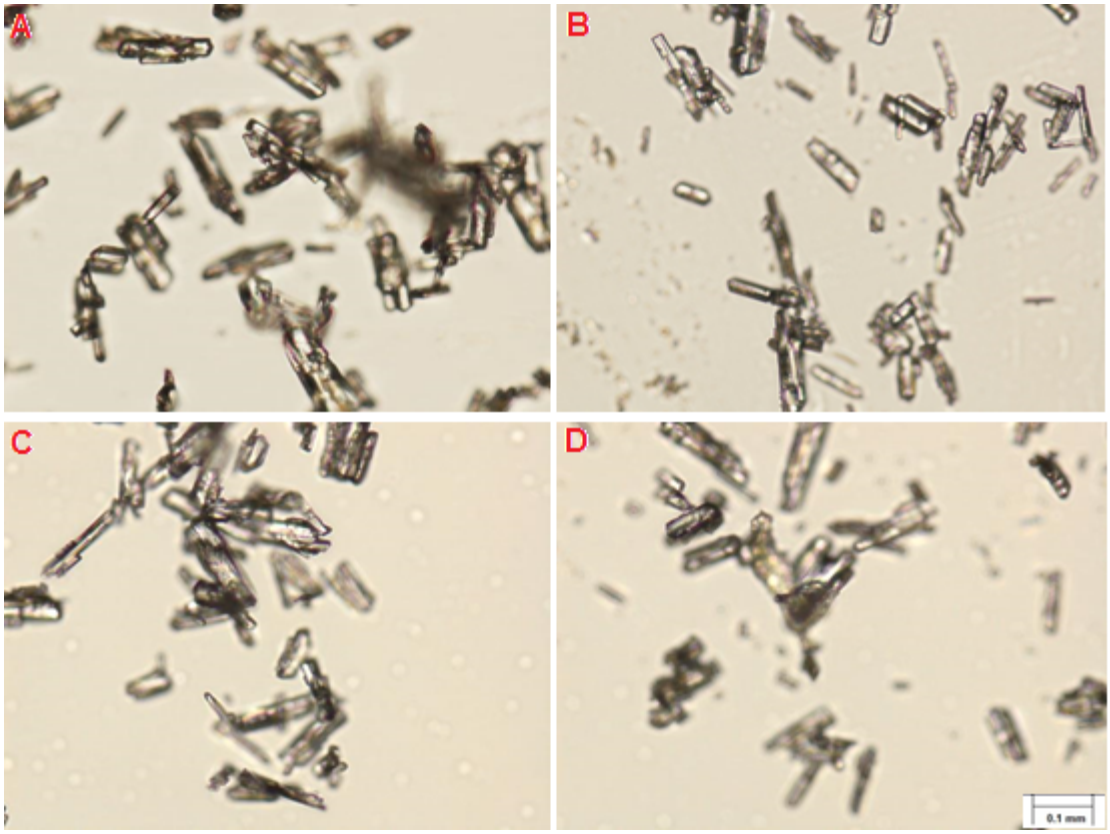


FIG. S3. Optical microscope images of ampicillin powder. A) uncoated ampicillin B) ampicillin with 5 minute coating (A05) C) ampicillin with 10 minute coating (A10) D) ampicillin with 20 minute coating (A20). Scale: 0.1mm

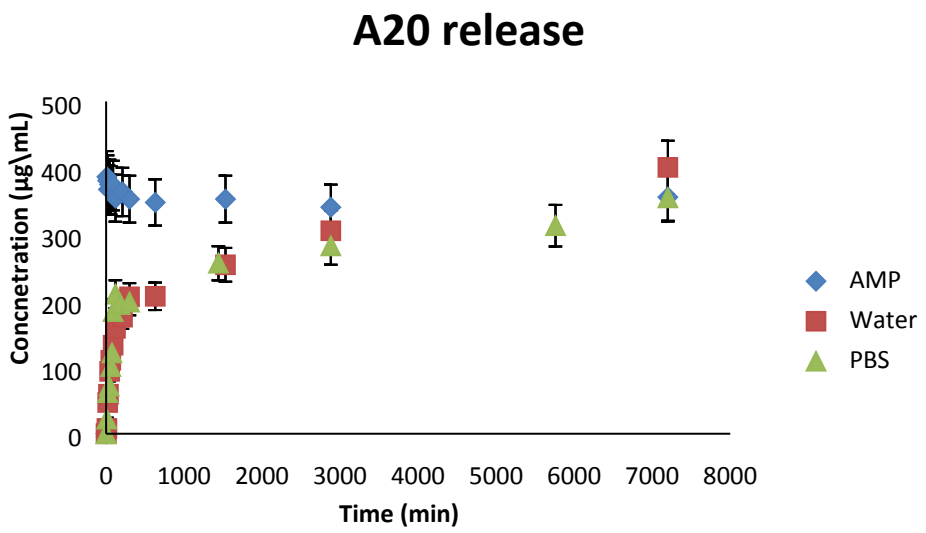


FIG. S4. Ampicillin release from A20 samples over 5 days from water and PBSWhere release of ampicillin into filtered water (■ ) and PBS ( ▲ ) from coated ampicillin powder based on UV-vis absorbance (268nm) where AMP (♦ ), was used as a reference. All error assumes a ±10% deviation.

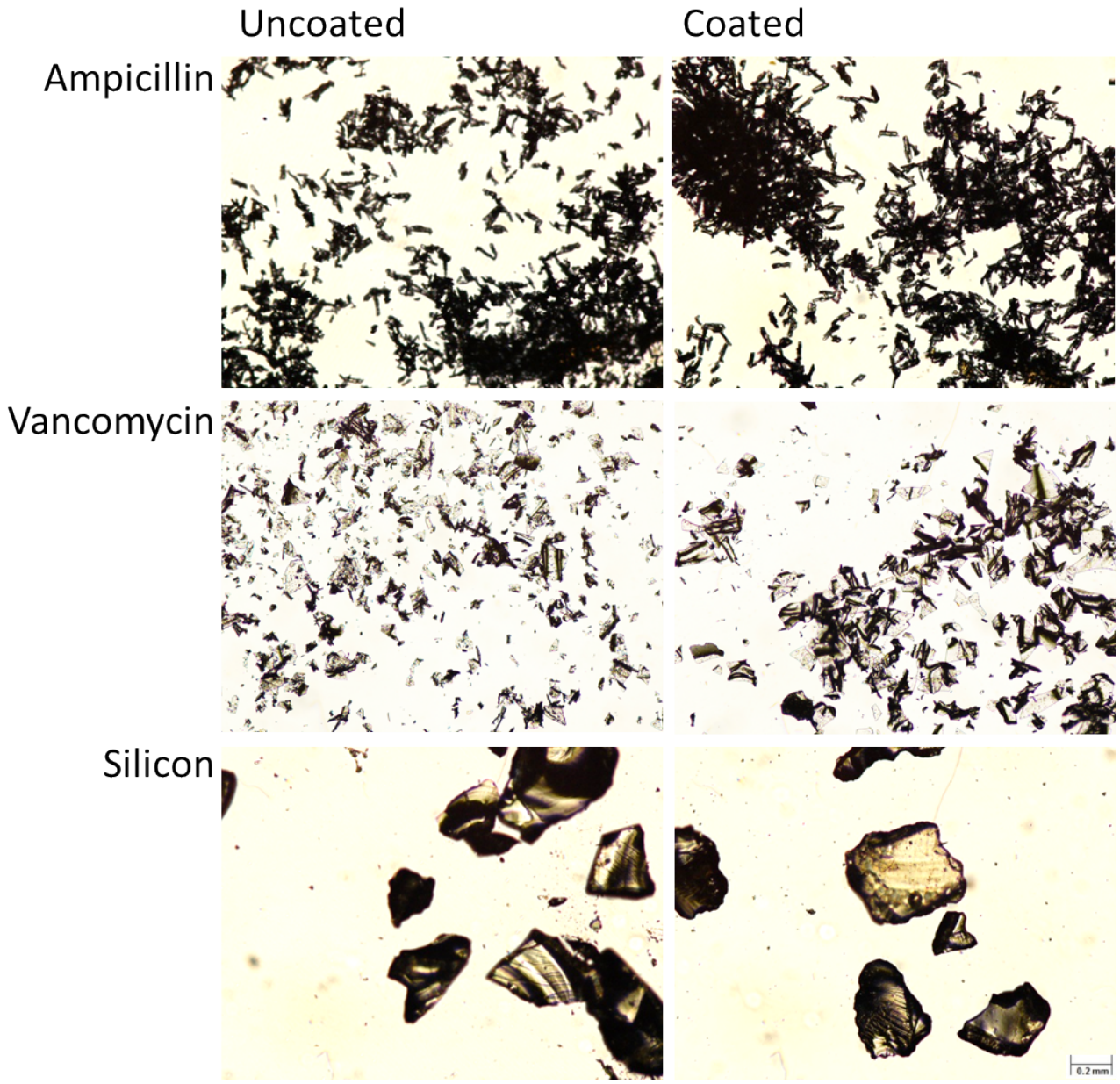


FIG. S5. Optical microscope images of ampicillin, vancomycin and Si with 20 minute with and without ppOD coating showing no apparent change in size of the coated particles. Scale: 0.2mm

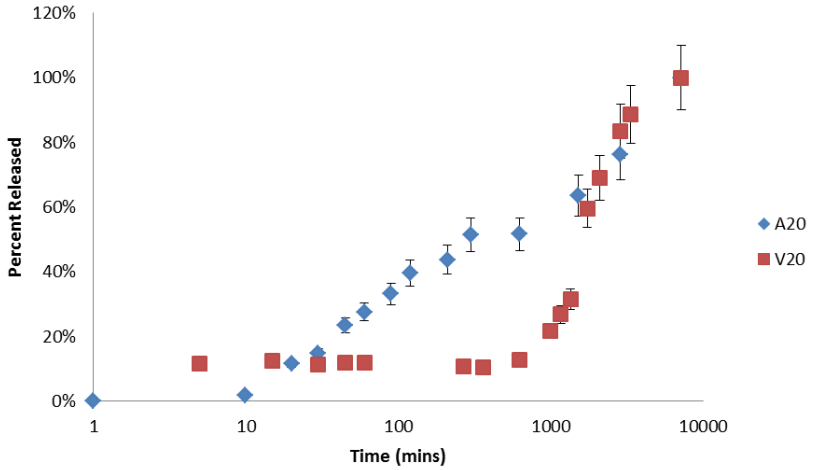


FIG 6 Comparative release of ampicillin and vacomycin from ppOD capsules (A20 (♦) and V20 (■ ) respectively) showing the difference in accumulative release relative to the final concentration released. All values based on UV-vis absorbance bands for individual antibiotics (268nm for ampicillin and 280nm for vancomycin) All error assumes a ±10% deviation.

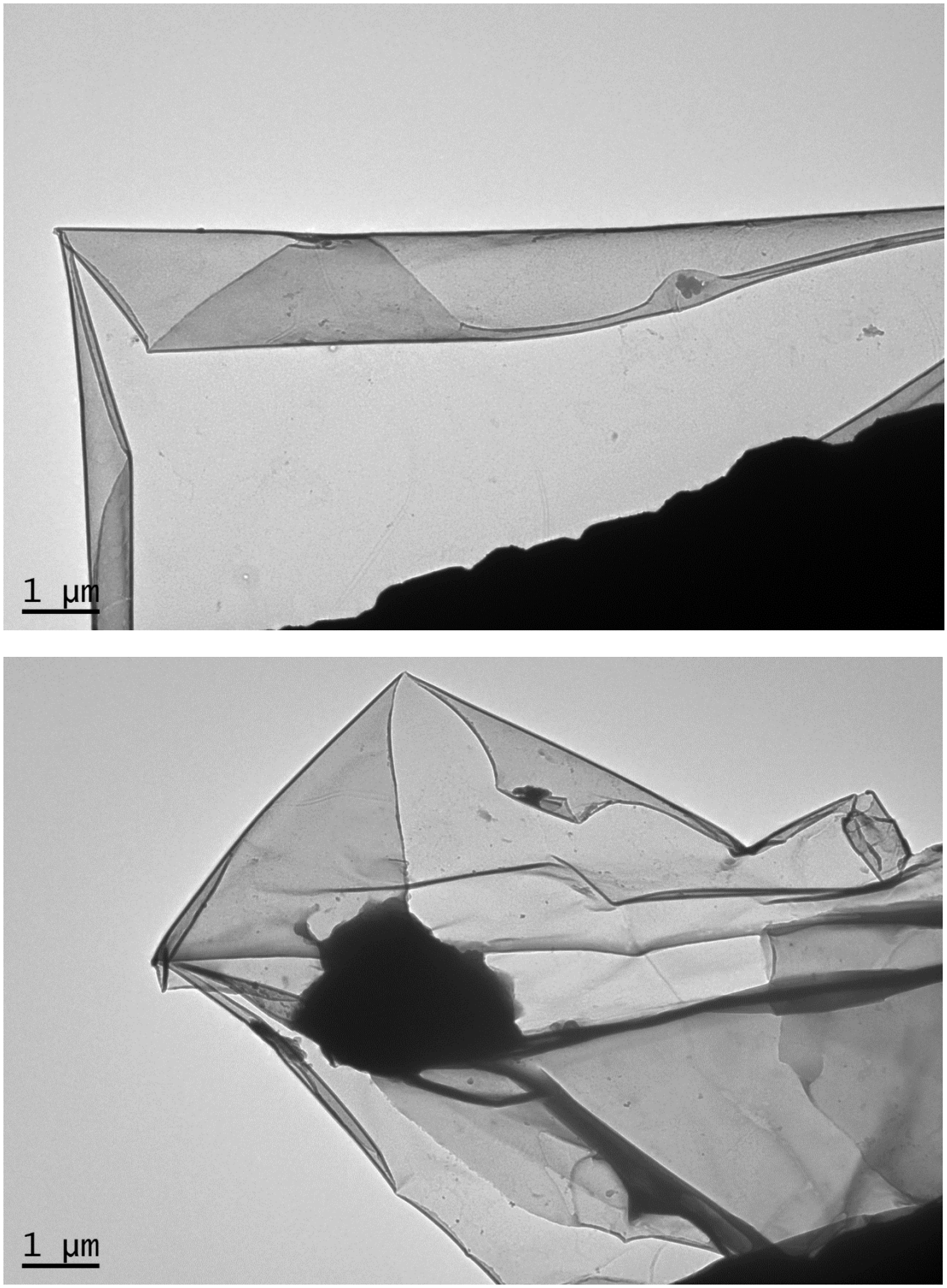


FIG. S7. TEM images of remaining polymer flakes from solution post release of ampicillin.

| Sample | Concentraion (µg\mL) 50 | 25 | 12.5 | 6.25 | 3.125 | 1.5625 | 0.78125 | 0.390625 | 0.1953125 | 0.09765625 | 0 | BLANK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Solution control | 0.859 | 0.912 | 0.904 | 0.888 | 0.889 | 0.897 | 0.893 | 0.895 | 0.917 | 0.892 | 0.900 | -0.001 |
| Coated Si | 0.178 | 0.659 | 0.862 | 0.879 | 0.878 | 0.894 | 0.890 | 0.890 | 0.901 | 0.875 | 0.886 | -0.001 |
| AMP | 0.000 | 0.000 | 0.000 | 0.000 | 0.051 | 0.563 | 0.818 | 0.866 | 0.865 | 0.879 | 0.875 | 0.000 |
| A05 | 0.000 | 0.001 | 0.000 | 0.000 | 0.023 | 0.432 | 0.806 | 0.852 | 0.864 | 0.891 | 0.895 | 0.000 |
| A10 | 0.003 | 0.000 | 0.000 | 0.004 | 0.052 | 0.629 | 0.840 | 0.879 | 0.863 | 0.849 | 0.857 | 0.000 |
| A20 | 0.003 | 0.002 | 0.002 | 0.000 | 0.122 | 0.666 | 0.871 | 0.896 | 0.868 | 0.886 | 0.880 | 0.001 |

Low turbidity

High turbidity

TABLE S1. Turbidity ($OD_{600nm}$) caused by E. coli post treatment with serial diluted coated and uncoated ampicillin showing MIC of ampicillin and, coated Si showing some inhibition of *E. coli* due to the interaction between the octadiene and bacteria.