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Supporting Information

Direct plasma synthesis of nano-capsules loaded with antibiotics

C. Lo Porto[a], F. Palumbo[b*], G. Palazzo[a] and P. Favia[b,c*]

a. Department of Chemistry, University of Bari "Aldo Moro", Via Orabona 4, 70126 Bari, Italy
b. Institute of Nanotechnology, National Research Council of Italy, c/o Department of Chemistry, University of Bari "Aldo Moro", Via Orabona 6, 70126 Bari, Italy
c. Department of Biosciences, Biotechnologies and Biopharmaceutics, University of Bari "Aldo Moro", Via Orabona 6, 70126 Bari, Italy

DBD reactor

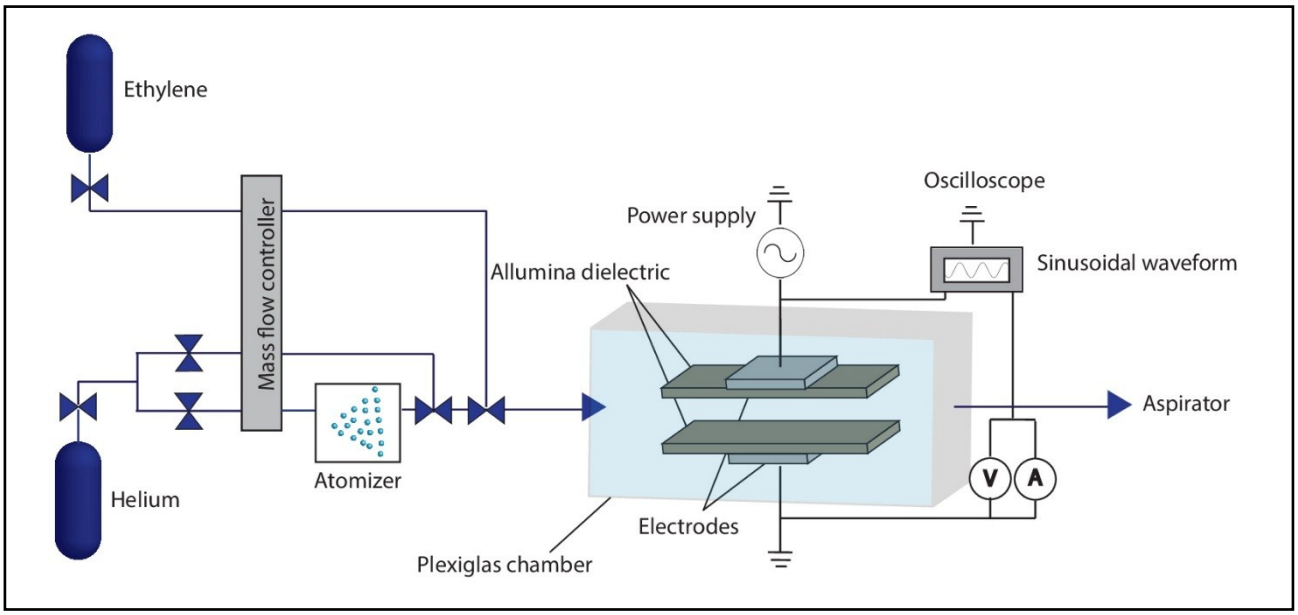

Fig. S1 Scheme of the DBD reactor used.

The DBD reactor, sketched in **Fig. S1**, used consists of two parallel plates silver electrodes, 5x8 cm^2 wide, 5mm apart, both covered with 0.63 mm thick alumina sheets as dielectric material.

Ethylene (99.95% Air Liquide) is inlet directly into the reactor chamber. He (99.999% Air Liquide) can be inlet directly inside the chamber or can pass through an atomizer (TSI mod 3076) working in recirculating mode. The atomizer is connected to a bottle containing the solution to be sprayed; in this work vancomycin hydrochloride (powder, Molecular Biology Grade, from ABCR) was diluted in Milli-Q quality water (Millipore, Bedford, MA) at a concentration of 15 mg/mL. The gas/aerosol feed is inlet from the longer side, passes through the gap between the two electrodes in the plasma zone and it is pumped out by an aspirator located on the opposite side. All gas flow rates were controlled by means of electronic mass flow controllers (MSK Instruments).

The whole apparatus is confined in a sealed Plexiglas chamber. The discharge is ignited between the two electrodes by means of a corona power supply (PVM500, Information Unlimited). The electrical parameters were controlled with a high-voltage (P6015A, Tektronix) and a resistance type current probe, both connected to an oscilloscope (TDS 2014C, Tektronix). The applied voltage was kept at a voltage of 4 kVpp (peak-to-peak) at a frequency of 24 kHz, corresponding to a delivered power of 1.28 Wcm^{-2}. The nano-capsules have been plasma-deposited on 1x1 cm^2 substrate shards cut from 710 µm thick double-face polished silicon (100) wafer (MicroChemicals GmbH) and placed on the bottom electrode in the plasma zone.

Scanning Electron Microscopy (SEM)

Scanning Electron Microscopy (SEM) analyses were run with a microscope (Zeiss Supra 400) equipped with a field-effect emission gun Gemini. The samples have been metallized by sputtering with a 20nm thick layer of chromium.

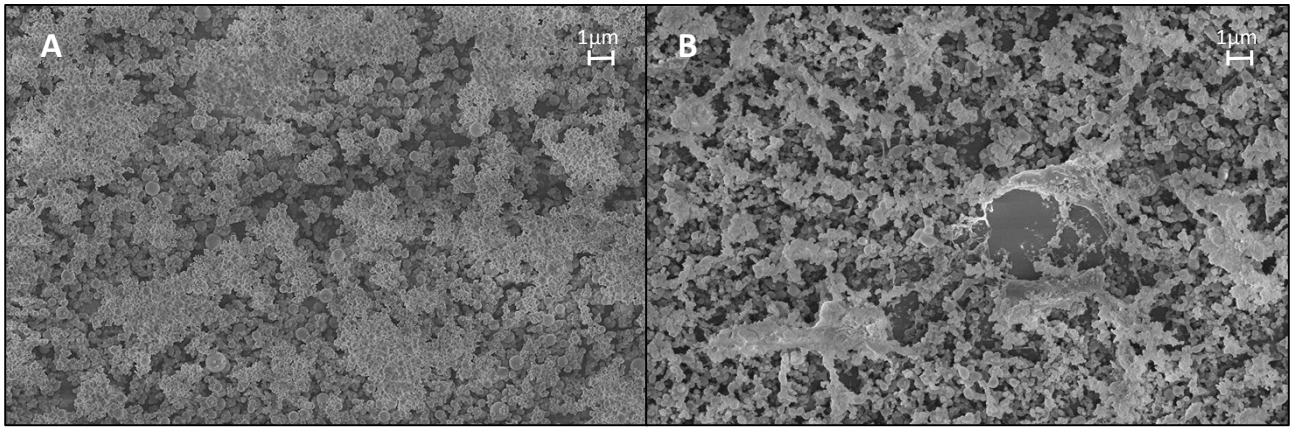

Fig. S2 Top view SEM images (extraction voltage of 2kV) of the PM before immersion (A) and after 5 minutes of immersion in water (B);

Confocal Microscopy

The substrate used in this case was coverglass (24x24 mm Agar Scientific, Germany). Laser scanning confocal microscopy was carried out with a direct confocal microscope (Leica TSC SP8 TCS SMD FLCS, Leica Microsystem, Germany) using an immersion lens x63, 1.40 numerical aperture oil immersion lens, and a fully tunable supercontinuum White Light Laser. Data were analyzed with Leica LAS AF LITE software (Leica microsystem, Germany).