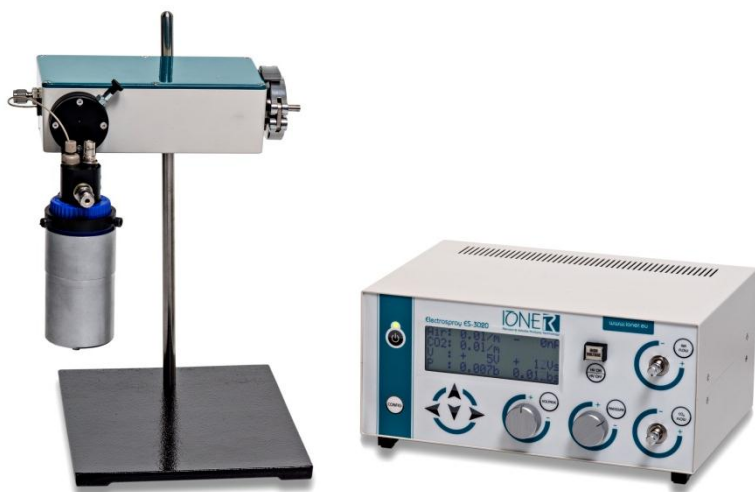


ES-3020 ELECTROSPRAY: Aerosol generator from liquid nanoparticle dispersions

Ioner Electropray ES 3020 is the best option to aerosolize Nanoparticles directly from the liquid dispersion. The ES-3020 is based on the electrofluid-dynamic atomization process of a liquid.

Ioner's Electropray is equipped with several capillaries with different ID and material that allows the electro spray phenomena of most of original dispersions without modification or dilution in a carrier solvent. Syringe pump available as option for accurately controlled flow rates for higher ID capillaries.

Ioner's Electropray produces highly monodisperse droplets and nanoparticles.



APPLICATIONS

- Nanoparticle production.
- Nanoparticle deposition.
- Fundamental electro spray research.
- DMA calibration.
- Source of biomolecules (DNA, Proteins) for Mass Spectrometers.

SPECIFICATIONS

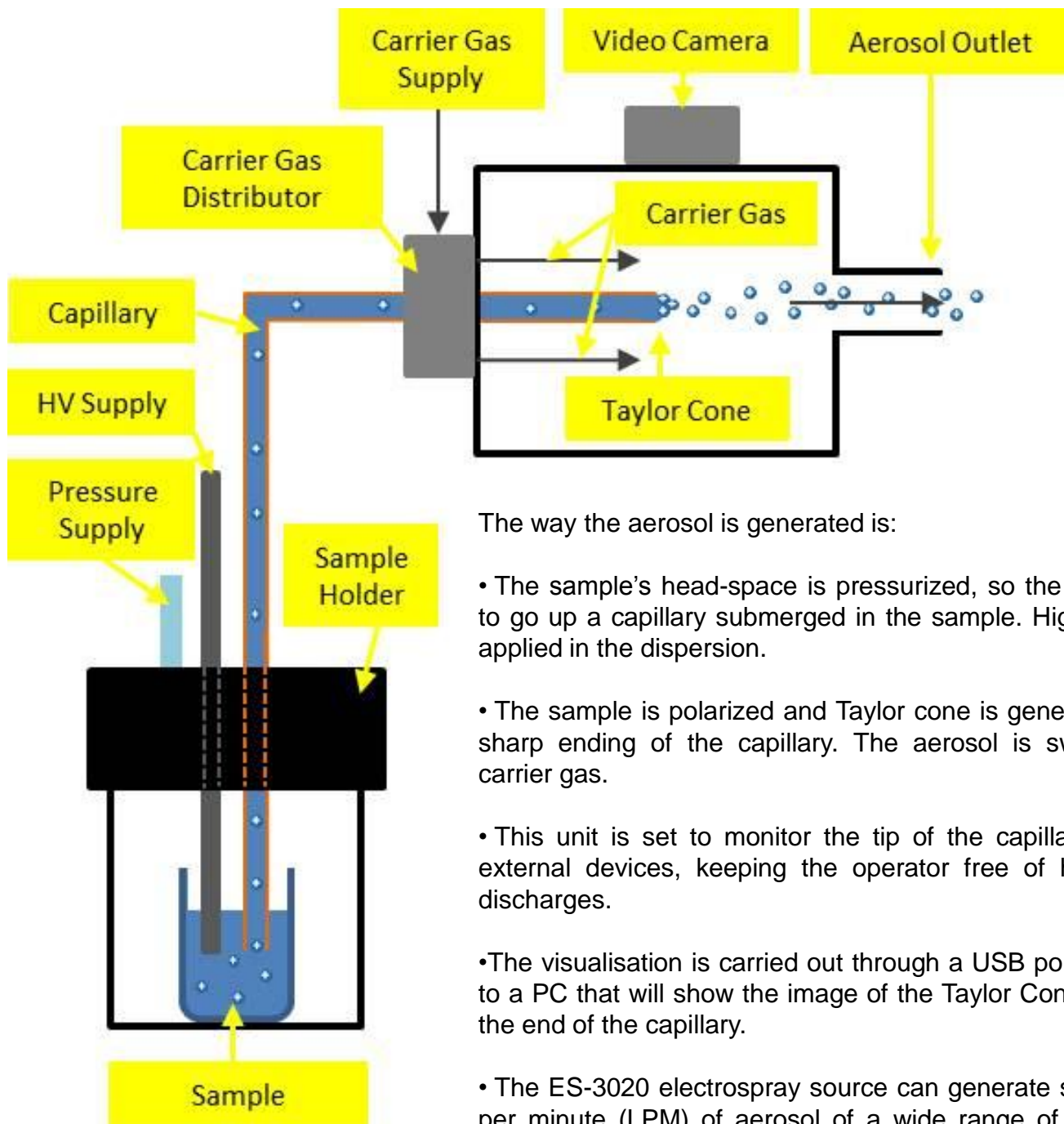
Maximum carrier gas pressure	5 bar
Max current	1 mA
Sample conductivity	5 µS/cm – 20 mS/cm
Carrier gas regulation range*1	0.2-10.0 SLPM (resolution: 0.01 SLPM)
Carrier gas connection	4 mm stainless steel compression 316
Maximum pressure gas pressure	2 bar
Pressure gas regulation range	0.010-1.000 bar (resolution: 0.001 bar)
Maximum pressure gas flowrate	3.5 SLPM @ 2 bar
Pressure gas connection	4 mm stainless steel compression 316
Dimensions: Control Unit	300 x 130 x 210 mm
Electrospray Unit	192 x 111 x 57 mm
Weight: Control Unit	5 Kg.
Electrospray Unit	2 Kg.
Power supply	100-240 VAC/50-60Hz
Max Consumption	60W
Operating temperature	5-40°C
Operating humidity conditions*2	5-80%
Communications	Ethernet
Software and Labview® drivers	Included

*1 Standard Litres Per Minute at 20 °C and 1 Atm., mixing of two carrier gases enabled (air + CO₂)

*2 Non-condensing

ES-3020 ELECTROSPRAY

WORKING PRINCIPLE



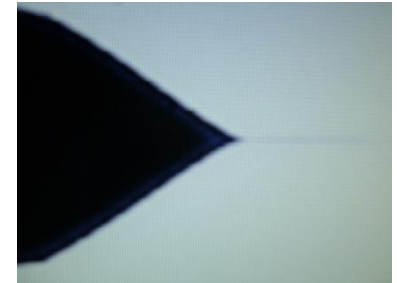
The way the aerosol is generated is:

- The sample's head-space is pressurized, so the sample has to go up a capillary submerged in the sample. High voltage is applied in the dispersion.
- The sample is polarized and Taylor cone is generated on the sharp ending of the capillary. The aerosol is swept by the carrier gas.
- This unit is set to monitor the tip of the capillary using no external devices, keeping the operator free of high voltage discharges.
- The visualisation is carried out through a USB port connected to a PC that will show the image of the Taylor Cone created at the end of the capillary.
- The ES-3020 electro spray source can generate several litres per minute (LPM) of aerosol of a wide range of gases and their mixtures (air, N₂, CO₂).
- The carrier gas flow is digitally controlled and visualised with a manual valve on the front of the control unit.

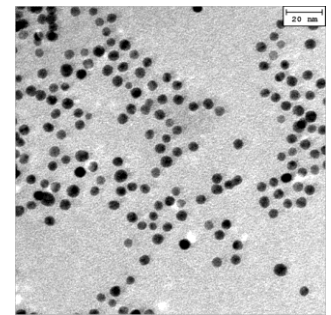
ES-3020 ELECTROSPRAY

FEATURES

- High versatility: aerosol can be generated horizontally or vertically (downwards or upwards).
- User friendly: easy maintenance and exchange of capillaries.
- Syringe pump available.
- Visual monitoring of Taylor’s cone.
- Monitoring of electric current delivered by HV source.
- Two LEDs for a better visualization of the jet and the spray image and video capture.
- Split in two modules (control unit and electro spray unit) for higher flexibility and mobility.
- Automatic pressure control.



Taylor cone view



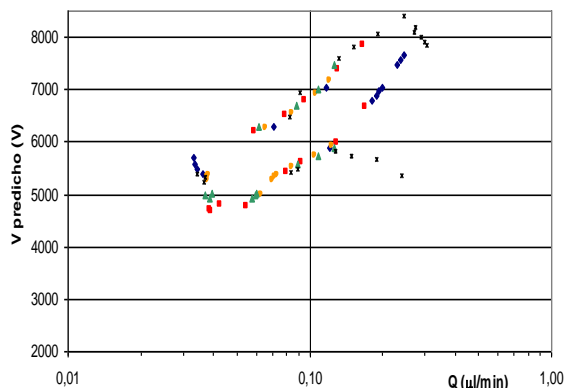
TEM image of gold nanoparticles (5nm) deposited by electro spray.

CAPILLARIES

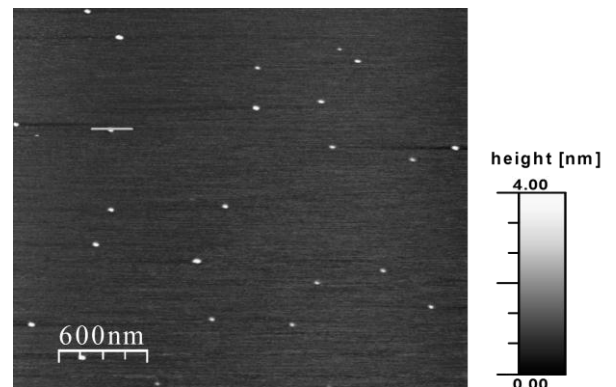
Available various types of capillaries*:

- PEEK (OD =1/16"); ID: 64, 102, 127, 152, 178, 254, 381 μm
- PEEKsil (OD =1/16"); ID: 25, 50, 75, 100, 150, 175, 200, 300 μm
- Stainless Steel 304: OD [μm] ID [μm]

400	160
500	260
600	300
700	400



Stability domain for Ubiquitine



AFM image of Fe_3O_4 nanoparticles (4nm) deposited by electro spray (Courtesy of F Briones IMM-CSIC)

* For capillaries with ID higher than 150 μm usage of Syringe Pump is recommended for non-viscous samples.