

Gencoa IMC75

Marking a new generation of circular ion source products



Adaptable to a wide range of R&D-based applications, Gencoa's new 3 inch circular ion source reaches new levels of flexibility in the ion source market

Linear Ion Sources have been slowly adopted in the vacuum coating technology arena for over 15 years. Still, a large section of the industry could benefit from the introduction of the technology for plasma treatment – before, during or after coating.

The main industrial-based application has been for substrate pre-treatment to promote adhesion of coatings onto plastic and glass.

The advantages of such ion sources include the low cost of implementation and maintenance, and the simple operating principles. The main limitations are the output currents and risks of contamination from the source itself.

The output currents, although limited to approximately 1 A/m length of source, are more than sufficient for pre-treatment applications at substrate speeds typically used in display and electronics industry.

The contamination element, although an inherent feature of many plasma sources, can be effectively eliminated by careful design and material selection.

One other aspect that reduces the ease of operation of such sources is the

beam energy and current regulation. A feedback control system is required in order to have complete control over these two parameters.

Gencoa have used a similar feedback system for reactive gas control to automatically regulate the flow and keep the beam current and energy constant whatever the chamber conditions.

This regulation is built into the plasma power supply (figure 1) which also drives the MFCs with a feedback mode linked to the voltage of the beam. The IMC75 can also be used with Gencoa's Speedflo feedback control family (figure 2).

Slow market take-up

The initial hype surrounding such devices, as is commonly the case, did not result in a large market or the expected number of applications. With the benefit of market experience it has become clearer that pre-treatment of insulating substrates is the prime application area. For large scale substrates this may remain the case in the long-term. Even for this prime application

area, these sources are not used in as large a number as the benefits warrant. Not only is adhesion improved, but the performance and consistency of the devices produced are improved.

Huge potential for R&D

Although current uses in industry are limited, uses for R&D and device development are varied and have great potential. The plasma beam can be used for many different purposes from pre-cleaning, etching and texturing of surfaces to ion beam deposition and ion assistance of coatings.



With the plasma being a DC self-neutralized type of beam, the costs associated with the power source are a fraction of those for RF or microwave type devices. Also, as this is an inverted type magnetron, it can occupy space alongside small sputter sources and use the same variable angle of the head.

For these reasons, Gencoa have developed the IMC75, the first in a range of such sources in a circular geometry design to fit into typical small R&D sputter and evaporation systems. Like magnetron sputter cathodes, they are robust devices and unlike other ion sources in the market, they require little maintenance and don't produce contamination.

Process control using power supply or Speedflo



Figure 1: The built-in Speedflo controller allows the ion source power supply to be used for controlling the beam energy and current.



Figure 2: Adding a Speedflo Mini to the system allows the control of three different gases, which increases to eight gases with Speedflo standard.

Key features of the IMC75

- Inverted magnetron plasma beam
- Self-neutralized plasma beam
- Operating pressure in large pressure range (E-4 to E-3 mbar)
- Tilting head – ion angle control
- Stable ion beam current and ion energy distribution
- Feedback control using Speedflo or power supply
- Variety of gas feeds possible
- No contamination
- Suitable for semiconductor industry

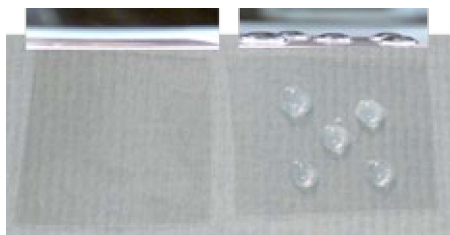


Plasma beam of the IMC75

Applications

Due to its flexibility, the IMC75 can be used in a host of process – both in the lab, and in the industry.

• Nanotexturing



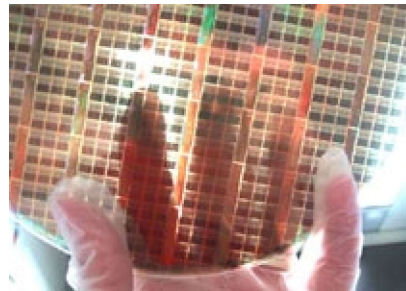
A comparison of non treated (right) and ion treated (left) PET surfaces.

• Coating removal



The above shows an example of copper-coated glass being etched at different target to substrate distances, with the white surface below the glass clearly highlighting the area that has been etched.

• Improving coating adhesion



The IMC75 can be used to improve the coating adhesion and lifetime of a touch panel functional coating, or to enhance the coating adhesion on glass. It can also be used for etching prior to deposition of semiconductor applications, which cleans the substrate and leads to an improved and more uniform deposition.

• ITO and silver deposition assistance



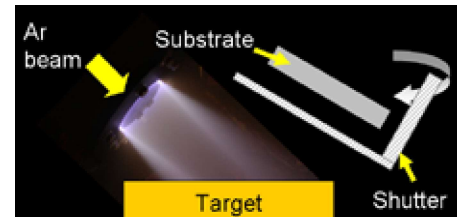
Enhancing coating properties of Ag and ITO

• PACVD - DLC deposition



DLC deposited on plastic web – a typical application of DLC on glass and plastic

• Ion beam deposition



Secondary deposition of layers by bombarding a target with the plasma beam

Further information

For more information on Gencoa's IMC75, visit www.gencoa.com/im75 or email sales@gencoa.com.