LINEAR ION-PLASMA SOURCES ON THE BASIS OF AN ACCELERATOR WITH CLOSED ELECTRON DRIFT

Description
Linear ion-plasma sources on the basis of an accelerator with closed electron drift are designed for finishing of large-area substrates (in particular, architectural glasses) before coating deposition and for ion assisting in the coating-deposition process. The structure of the ion-plasma source ensures high uniformity of the ion-flux density.

Technical specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
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<tbody>
<tr>
<td>Supply voltage, V</td>
<td>600 - 1000</td>
</tr>
<tr>
<td>Linear current density, A/m</td>
<td>Up to 2</td>
</tr>
<tr>
<td>Operating pressure range, Pa</td>
<td>0.05 – 0.3</td>
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<tr>
<td>Cooling</td>
<td>water</td>
</tr>
<tr>
<td>Length, m</td>
<td>Up to 2.5</td>
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Ion-plasma sources 350 mm long.

Technical appraisal and economic benefits
A distinctive feature of the device is the use of an additional hollow cathode discharge, which increases the efficiency of dielectric substrate cleaning at low operating voltages. The source operation is characterized by simultaneous existence in the working chamber of the hollow cathode discharge volume plasma and the ion flow formed by the closed drift accelerator. The ion-beam energy reaches 200 - 400 eV, which is optimum for ion cleaning and ion assisting.

Application area
The device can be used in technologies of ion-plasma modification of surfaces of various materials and articles. The main objective is surface cleaning and etching before application of coatings and ion assisting in the coating-deposition process. The prospects of using ion-plasma sources for application of solid carbon-based coatings onto dielectric substrates are demonstrated. The high uniformity of the linear density of the ion current (within ±4%) allows the sources to be used in microelectronics.

Development stage
The ion-plasma sources are produced in small lots on agreements and international contracts. These sources are used in vacuum facilities of the VNUK series.
Patent situation
The device is patentable, but no application was submitted.

Commercial offers
Production and procurement contract on the basis of customer’s specifications.

Estimated cost
70 – 200 thousand rubles, depending on the source size and list of equipment.

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