

Substrate holders of this type are used for example in ion implantation plants. Plants of this type can rotate the substrate or the substrates at certain angles, cf. US2014/0290862 A1. Furthermore, a degree of translational freedom can likewise be considered as an extension of a substrate holder, cf. US2015/0170952A1. Detaching the substrates from the holders has already been investigated appropriately cf. DOI: 10.1585/pfr.3.051 and the relationships of the substrate material with the electrostatic holding force, cf. DOI: 10.1063 / 1.2778633.

The prior art therefore discloses substrate holders, which fasten substrates by means of electrostatic holding forces and allow up to three degrees of freedom (two tilting axes and one translation axis).

In the prior art, electrodes are used for generating the electrostatic holding forces, which electrodes are accommodated on the surface of the substrate holder or in the volume of the substrate holder and accordingly also carry out all movements to which the substrate is exposed during processing. Sliding contacts are used for contacting the said electrodes.

However, the executable movement procedures are limited using the plants of the prior art. The substrates which are held, are held electrostatically in the known substrate holders. However, these do not allow a complete repeatable rotation, which could occur without discharging particles, as the contacting of the electrostatic holding surface is executed by means of sliding contacts. The sliding contacts always create particle abrasion, which has a disadvantageous effect for high-vacuum plants or plasma plants in particular.

Embodiments of the present invention provide an improved electrostatic substrate holder. In particular, the undesired particle abrasion during rotation should be minimized or even prevented. In addition, the movability of the holder should be improved.

According to an aspect of the present invention, there is provided an electrostatic substrate holder for accommodating and holding a substrate, having: a rotor, having a holder for fixing the substrate on a holding surface, a stator for accommodating and bearing the rotor, electrodes for generating an electrostatic holding force for fixing the substrate, whereby the stator has the electrodes, whereby the electrodes being separated from the holding surface, wherein the rotor is mounted by means of electrically conductive bearing elements, wherein the electrically conductive bearing elements (10) touch the electrodes of the stator.

All combinations of at least two features specified in the description, the claims and/or the figures also fall within the scope of the invention. When value ranges are specified, values lying within the limits mentioned should also be disclosed as limit values and be claimable in any desired combination.

An electrostatic substrate holder according to an embodiment of the invention (also termed sample holder or holding device in the following) for accommodating and holding a substrate has:

- a rotor, having a holder with a holding surface for fixing the substrate on the holding surface (also termed fixing area or fixing surface in the following),
 - a stator for accommodating and mounting the rotor,
 - electrodes for generating an electrostatic holding force for fixing the substrate,
- wherein the stator has the electrodes.

Embodiments of the holding device according to the invention may handle any substrate, independently of the diameter thereof.

Embodiments of the invention furthermore relate to a method for processing a substrate, wherein the substrate is held and rotated by an electrostatic substrate holder according to the invention. All embodiments of the substrate holder according to the invention therefore also apply for the method.

Embodiments of the invention furthermore relate to a processing plant, having a processing apparatus for processing a substrate and an electrostatic substrate holder according to the invention for holding the substrate. All embodiments of the substrate holder according to the invention therefore also apply for the processing plant.

Embodiments of the invention in particular consist in the electrodes being located not on the holding surface, but rather on and/or in the stator.

The advantage of embodiments of the invention in particular is that the substrate holder according to the invention can be designed without sliding contacts. As a result, undesired particle abrasion during the rotation is minimized or even prevented, which is advantageous for high-vacuum plants or plasma plants in particular.

The particle number in a processing chamber, in which the sample holder is located, is reduced considerably; this keeps the surface of the fixed substrate or the sample holder according to the invention clean.

The electrostatic substrate holder according to embodiments of the invention decouples the electrostatic holding property from the mechanical movement apparatus, so that by dispensing with sliding contacts of the electrostatics of the substrate holder, a reduced, preferably minimal, particle discharge is generated.

Furthermore, a further and additional contamination of the sample holder by a more or less encapsulated construction is avoided or at least greatly reduced.

Advantages of embodiments of the invention are the reduced discharged particle quantity due to the avoidance of sliding parts and extension of the executable, reproducible movement procedures.

The stator also includes the part termed the electrostatic or electrical module. The rotor also includes the part termed the mechanical module. Embodiments of the invention of holding and moving the