Receiving Means for Mounting of Wafers

Specification

The invention relates to a receiving means for receiving and mounting of wafers and a device and a method for aligning a first wafer with a second wafer using the receiving means.

These receiving means or sample holders or chucks are available in diverse versions and a flat receiving surface or mounting surface is decisive for the receiving means, so that the structures which are becoming smaller and smaller can be correctly aligned and bonded on wafer surfaces which are larger and larger over the entire wafer surface. This is especially important when a so-called prebonding step which joins the wafers to one another by means of a separable interconnection is carried out before the actual bond process. High alignment accuracy of the wafers to one another is especially important as soon as an alignment accuracy or especially distortion values of < 2 μm are to be achieved for all structures located on one or both wafers. In the vicinity of the alignment marks this succeeds especially well in the indicated receiving means and devices for alignment, so-called aligners, especially bond aligners. With increasing distance from the alignment marks, controlled and perfect alignment with alignment accuracies or especially distortion values better than 2 μm, especially better than 1 μm and even more preferably better than 0.25 μm cannot be achieved.

Embodiments of this invention improve generic receiving means such that more accurate alignment can be achieved with them.

According to a first aspect, there is provided a receiving means for receiving and mounting of wafers, the receiving means including: a mounting surface, mounting means for mounting of the wafer on the mounting surface and compensation means for active, locally controllable, at least partial compensation of local and/or global distortions of the wafer, wherein the strain of the mounting surface can be locally influenced by the compensation means by arrangement of piezoelements that are individually activated on one back of the mounting surface.

According to a second aspect, there is provided a device for alignment of a first wafer with a second wafer, the device including: a means for determining local alignment errors which have occurred due to strain and/or distortion of the first wafer relative to a second wafer, with a first strain map of the first wafer and/or a second strain map of the second wafer and evaluation means for evaluation of the first and/or second strain maps, at least one of the above receiving means for receiving at least one of the wafers and alignment means for alignment of the wafers with consideration of position maps and/or strain maps and simultaneous compensation by the compensation means.

According to a third aspect, there is provided a method for alignment of a first wafer with a second wafer, the method including the steps of: detecting a first strain map of the first wafer and/or a second strain map of the second wafer and evaluation of the first and/or second strain maps by evaluation means and determination of the local alignment errors, receiving at least one of the wafers on the above receiving means and aligning the wafers with consideration of position maps and/or strain maps and simultaneous compensation by the compensation means.

Advantageous embodiments of the invention are also disclosed. All