photoresist.

[0013]

Embodiments of the present invention was made in view of such problems. Embodiments of the present invention seek to provide a method for manufacturing semiconductor chips, in which photolithography is not necessary and plasma irradiation can divide (separate) a wafer into chips with more certainty, highly suppressing occurrence of defective chips.

(MEANS FOR SOLVING PROBLEMS)

[0014]

According to an aspect of the present invention, there is provided a method for manufacturing semiconductor chips, including a step a of pasting a mask integrated surface protective tape, which includes a surface protective tape and a mask material layer being provided on the surface protective tape, over a patterned surface side of a semiconductor wafer, grinding a back surface of the semiconductor wafer, pasting a wafer fixing tape onto the grinded back surface of the semiconductor wafer, and fixing and supporting the semiconductor wafer with a ring frame; a step b of peeling off the surface protective tape from the mask-integrated surface-protective tape to expose the mask material layer, and then cutting a part of the mask material layer that corresponds to a street of the semiconductor wafer by using a laser to make an opening for the street of the semiconductor wafer; a step c of plasma dicing wherein plasma irradiation cuts the semiconductor wafer at the street and separates the semiconductor wafer into semiconductor chips; and a step d of pasting a peeling tape on the mask material layer, and peeling off the peeling tape together with the mask material layer to remove the mask material layer, wherein the peeling tape is made of radiation curable resin, and, in the step d, after pasting the peeling tape on the mask material layer, radioactive ray is irradiated thereon to cure the peeling tape and then the peeling tape is peeled off together with the mask material layer.

[0015]

The peeling tape is made of radiation curable resin, and it is preferable that, in the step d, after pasting the peeling tape on the mask material layer, radioactive ray is irradiated thereon to cure the peeling tape and then the peeling tape is peeled off together with the mask material layer.

[0016]

An adhesive strength between the peeling tape and the mask material layer in the step d is preferably greater than an adhesive strength between the surface protective tape and the mask material layer in the step b.

[0017]

According to embodiments of the present invention, plasma irradiation can divide a wafer into chips and thus occurrence of defective chips can be suppressed. At this time, since a mask is formed by using the mask-integrated surface protective tape having the mask material layer on the surface protective tape, photolithography process is not necessary. Thus, equipment for the photolithography process is unnecessary, which can reduce the chip cost. Also, a masking process with photoresist is unnecessary and thus the whole treatment process can be shortened.

[0018]

Also, the mask material layer is peeled off by the peeling tape and thus, compared with a case in which the mask material layer is removed by ashing for example, damages to a circuit patterned surface of the semiconductor wafer can be prevented.

[0019]

Also, radiation curable resin is used as the peeling tape. Thus, when radioactive ray is irradiated to cure the peeling tape after the peeling tape is pasted, the peeling tape can be contracted. This deformation of the peeling tape due to the contraction makes sure that the peeling tape engages with the mask material layer and thus can enhance the adhesive strength between the peeling tape and the mask material layer when the peeling tape is peeled off together with the mask material layer. As a result, the mask material layer can be peeled off with certainty.

[0020]

Also, the adhesive strength between the peeling tape and the mask material layer when peeling off the mask material layer is greater than the adhesive strength between the surface protective tape and the mask material layer when peeling off the surface protective layer and thus such an effect can be obtained with certainty.

(EFFECTS OF THE INVENTION)

[0021]

Embodiments of the present invention can provide a method for manufacturing semiconductor chips, in which photolithography process is not necessary and plasma irradiation can divide (separate) a wafer into chips with more certainty, highly suppressing occurrence of defective chips.

BRIEF DESCRIPTION OF DRAWINGS

WHAT IS CLAIMED IS

1. A method for manufacturing semiconductor chips comprising:

a step a of pasting a mask-integrated surface-protective tape, which includes a surface protective tape and a mask material layer being provided on the surface protective tape, over a patterned surface side of a semiconductor wafer, grinding a back surface of the semiconductor wafer, pasting a wafer fixing tape onto the grinded back surface of the semiconductor wafer, and fixing and supporting the semiconductor wafer with a ring frame;

a step b of peeling off the surface protective tape from the mask-integrated surface-protective tape to expose the mask material layer, and then cutting a part of the mask material layer that corresponds to a street of the semiconductor wafer by using a laser to make an opening for the street of the semiconductor wafer;

a step c of plasma dicing wherein plasma irradiation cuts the semiconductor wafer at the street and separates the semiconductor wafer into semiconductor chips; and

a step d of pasting a peeling tape on the mask material layer, and peeling off the peeling tape together with the mask material layer to remove the mask material layer, wherein

the peeling tape is made of radiation curable resin, and, in the step d, after pasting the peeling tape on the mask material layer, radioactive ray is irradiated thereon to cure the peeling tape and then the peeling tape is peeled off together with the mask material layer.

2. The method for manufacturing semiconductor chips according to claim 1, wherein

an adhesive strength between the peeling tape and the mask material layer in the step d is greater than an adhesive strength between the surface protective tape and the mask material layer in the step b.

3. The method for manufacturing semiconductor chips according to either claim 1 or 2, wherein

the mask material layer is formed of a non-radiation curable adhesive agent.