

Claims

What is claimed is:

1. A method of MEMS device fabrication, comprising:

- etching a plurality of trenches into a substrate wafer;
- applying an insulating layer to a surface of the substrate wafer;
- filling the plurality of trenches with a MEMS base material;
- applying a second insulating layer to the surface of the substrate wafer;
- depositing a layer of a first conductive material surface of the substrate wafer;
- patterning the layer of a first conductive material;
- applying a third insulating layer to the surface of the substrate wafer;
- patterning the third insulating layer;
- depositing a layer of a second conductive material to the surface of the substrate wafer;
- patterning the layer of a second conductive material;
- etching into the substrate wafer to create a plurality of holes in the substrate wafer;
- and
- etching into the substrate wafer through the plurality of holes, wherein the etching detaches the MEMS device from the substrate wafer.

2. The method of claim 1, wherein the MEMS base material comprises a conductive material.

3. The method of claim 1, wherein the MEMS base material comprises a structural material.

4. The method of claim 1, wherein etching into the substrate wafer through the plurality of holes further comprises releasing one or more motion structures of the MEMS device by etching a sacrificial layer between the one or more motion structures and a lower layer of the MEMS device.

5. The method of claim 4, wherein the sacrificial layer comprises one or more of the first, second, and third insulating layers.

6. The method of claim 1, wherein the first and second conductive materials comprise the same material.

7. The method of claim 1, wherein the first and second conductive materials comprise different materials.

8. The method of claim 1, wherein one or more of the plurality of trenches is wider than the other trenches.

9. A MEMS device prepared by a process comprising:

anisotropically etching a plurality of trenches into a substrate wafer;

applying an insulating layer to the substrate wafer surface;

filling the plurality of trenches with a layer of a first conductive material;

applying a second insulating layer to the substrate wafer surface;

depositing a layer of a second conductive material;

patterning the layer of a second conductive material;

applying a third insulating layer to the substrate wafer surface;

patterning the third insulating layer;

depositing a layer of a third conductive material;

patterning the layer of a third conductive material;

anisotropically etching into the substrate wafer to create a plurality of holes in the substrate wafer; and

isotropically etching into the substrate wafer through the plurality of holes, wherein the isotropic etching detaches the MEMS device from the substrate wafer.