(i.e., is part of the cleave software). In some embodiments, sound is sensed and monitored and recording is triggered when a change in sound is sensed (e.g., audio power exceeds a predetermined threshold).

[0061] In embodiments in which a trigger sensor 150 is used, the trigger sensor 150 triggers the controller 130 to indicate the start of cleaving to allow the controller 130 to begin saving and/or analyzing the output from the acoustic sensor 120. In embodiments in which the system 100 includes an analog-to-digital converter 125 (Fig. 7), the trigger sensor 150 may be used to trigger the converter 125.

[0062] Referring to Figure 10, the acoustic sensor 120 and trigger sensor 150 may be part of a mountable cleave monitoring system 203 that may be mounted to existing cleaving apparatus such as mechanical cleaving devices. The mountable cleave monitoring system 203 includes a bracket 210 for mounting the system 203 to the cleaving device 110 (Figures 11 and 12). In this embodiment, the bracket 210 includes set screws 215 for securing the bracket 210 to the cleaving device 110. Other embodiments of the monitoring system 203 may include other types of fasteners for securing the system 203 to the cleaving device.

[0063] The acoustic sensor 120 and trigger sensor 150 are each mounted to the bracket 210. As show in Figures 10-12, the acoustic sensor 120 is a microphone and the trigger sensor 150 is a photoelectric sensor. Other types of acoustic sensors 120 and trigger sensors 150 may be used in other embodiments of the mountable cleave

CLAIMS:

1. A cleave system for separating a bonded wafer structure, the system comprising:

a cleaving device for cleaving the bonded wafer structure along a cleave plane;

an acoustic sensor for sensing sound emitted from the bonded wafer structure during cleaving and to generate an output in response to the sensed sound;

a controller configured to generate a metric related to an attribute of the cleave based at least in part on the output of the acoustic sensor; and

a trigger sensor for detecting when a cleave sequence has commenced for cleaving the bonded wafer structure and to trigger recording of sound produced by the bonded wafer structure during the cleave, the trigger sensor being a photoelectric sensor or a limit switch.

2. The cleave system as set forth in claim 1 wherein the metric is derived from an audio power profile generated during the cleave.

3. The cleave system as set forth in claim 1 wherein the cleaving device is a mechanical cleaving device configured to produce a propagated cleave of the bonded wafer structure.

4. The cleave system as set forth in claim 1 wherein the cleaving device is a thermal cleaving device.

5. The cleave system as set forth in claim 1 further comprising an analog-to-digital converter for converting sound sensed by the acoustic sensor into data, the metric related to an attribute of the cleave generated

by the controller being based at least in part on the data generated by the analog to digital converter.

6. The cleave system as set forth in claim 5 wherein the analog-to-digital converter comprises a digitizer or a sound card.

7. The cleave system as set forth in claim 1 wherein the controller is configured to generate 2 or more metrics related to attributes of the cleave based at least in part on the output of the acoustic sensor.

8. A mountable cleave monitoring system comprising:

a bracket for mounting the system to a cleaving device for separating bonded wafer structures;

an acoustic sensor for sensing sound emitted from a bonded wafer structure during cleaving, the acoustic sensor being mounted to the bracket; and

a trigger sensor for detecting when a cleave sequence has commenced for cleaving the bonded wafer structure and to trigger recording of sound produced by the bonded wafer structure during the cleave, the trigger sensor being mounted to the bracket, the trigger sensor being a photoelectric sensor or a limit switch.

9. A method for separating bonded wafer structures, the method comprising:

cleaving a bonded wafer structure;

detecting when a cleave sequence has commenced for cleaving the bonded wafer structure to trigger recording of sound produced by the bonded wafer structure

during the cleave, the cleave sequence being detected by a trigger sensor, the trigger sensor being a photo-electric sensor or a limit switch;

sensing sound emitted from the bonded wafer structure during cleaving and after a cleave sequence was detected by the trigger sensor; and

generating a metric related to an attribute of the cleave based on sensed sound.

10. The method as set forth in claim 9 comprising a cleave control parameter to improve the quality of the cleave of subsequently cleaved bonded wafer structures.

11. The method as set forth in claim 9 wherein the metric is derived from an audio power profile generated during the cleave.

12. The method as set forth in claim 11 wherein the metric is selected from the group consisting of delay between a cleave trigger and a start of cleave, duration of the cleave, mean power, maximum power, frequency at which maximum power occurs, standard deviation of power, magnitude of power oscillations, amount of cleave time below a threshold power, maximum single dip time below a threshold power and the number of power dips below a threshold power.

13. The method as set forth in claim 9 wherein the bonded wafer structure is cleaved mechanically by propagation or is cleaved thermally.

14. The method as set forth in claim 9 comprising detecting when a cleave sequence has commenced

for cleaving the bonded wafer structure, wherein sound is sensed upon detecting that the cleave sequence has commenced.

15. The method as set forth in claim 9 comprising converting sensed sound into data, the metric related to an attribute of the cleave being based on the data.

16. The method as set forth in claim 9 wherein generating a metric related to an attribute of the cleave based on sensed sound comprises generating a power function by a fast Fourier transform algorithm.

17. The method as set forth in claim 16 wherein the algorithm is a stepped fast Fourier transform algorithm.

18. The method as set forth in claim 9 wherein the generating a metric related to an attribute of the cleave based on sensed sound comprises generating a power function by digital filtering.