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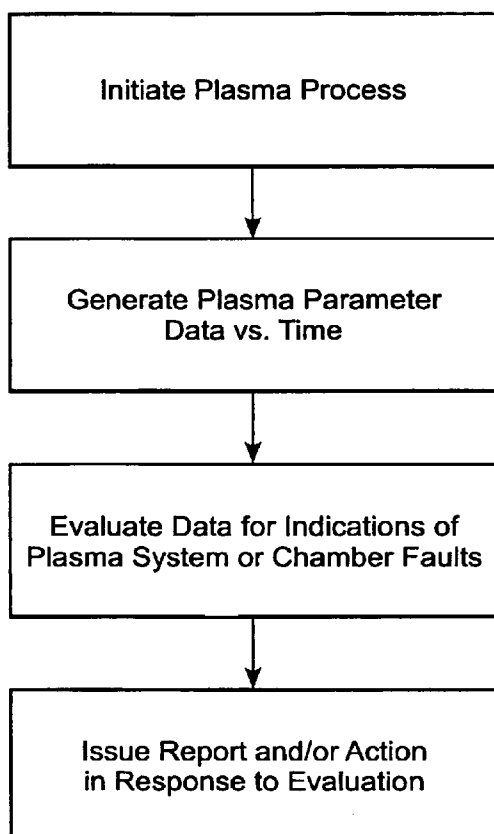
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(54) Title: METHOD AND APPARATUS TO DETECT FAULT CONDITIONS OF A PLASMA PROCESSING REACTOR



(57) Abstract: A method of fault detection for use in a plasma processing chamber is provided. The method comprises monitoring plasma parameters within a plasma chamber and analyzing the resulting information. Such analysis enables detection of failures and the diagnosis of failure modes in a plasma processing reactor during the course of wafer processing. The method comprises measuring the plasma parameters as a function of time and analyzing the resulting data. The data can be observed, characterized, compared with reference data, digitized, processed, or analyzed in any way to reveal a specific fault. Monitoring can be done with a detector such as a probe, which is preferably maintained within the plasma chamber substantively coplanar with a surface within the chamber, and directly measures net ion flux and other plasma parameters. The detector is preferably positioned at a grounded surface within the reactor such as a grounded showerhead electrode, and can be of a planar ion flux probe (PIF) type or a non-capacitive type. Chamber faults that can be detected include a build-up of process by-products in the process chamber, a helium leak, a match re-tuning event, a poor stabilization rate, and a loss of plasma confinement. If the detector is a probe, the probe can be embedded in a part of a plasma processing chamber and can comprises one or more gas feed-through holes.

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