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(71) Applicant (for all designated States except US): **LAM RESEARCH CORPORATION** [US/US]; 4650 Cushing Parkway, P1425PCT, Fremont, California 94538 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **GAFF, Keith** [AU/US]; c/o 4650 Cushing Parkway, Fremont, California 94538 (US). **BENJAMIN, Neil Martin Paul** [GB/US]; c/o 4650 Cushing Parkway, Fremont, California 94538 (US).

(74) Agent: **NGUYEN, Joseph, A.**; PO BOX 700640, San Jose, California 95170 (US).

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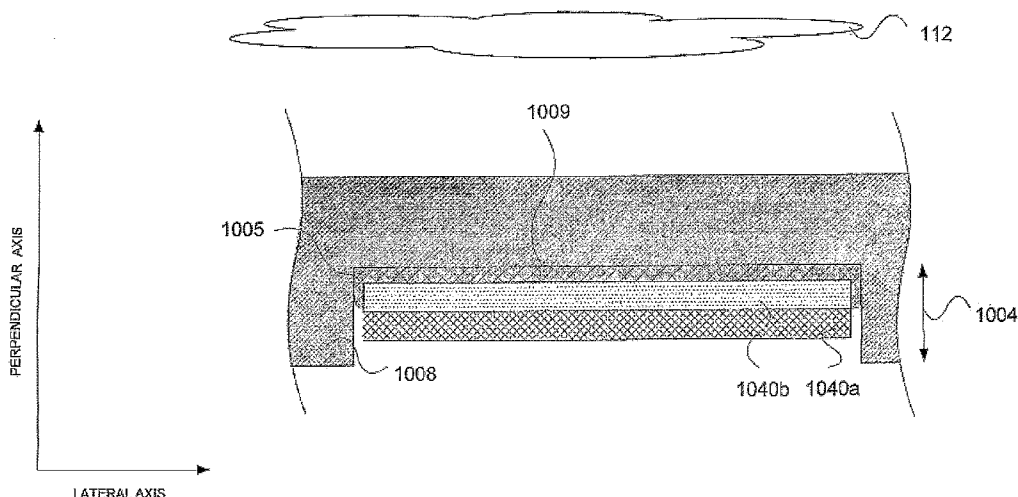
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(54) Title: APPARATUS FOR DETERMINING A TEMPERATURE OF A SUBSTRATE AND METHODS THEREFOR



(57) Abstract: An apparatus for measuring a temperature of a substrate is disclosed. The apparatus includes a phosphor material in thermal contact to the substrate, the phosphor material producing a fluorescent response in a first wavelength range when exposed to an electromagnetic radiation in a second wavelength range, the fluorescent response decaying at a decay rate that is related to a temperature of the phosphor material, and the phosphor material producing a first set of non volatile byproducts when exposed to a plasma. The apparatus also includes a barrier window positioned between the phosphor material and a plasma, wherein the barrier window allows at least a portion of the first wavelength and the second wavelength to be transmitted, and wherein the barrier window produces a second set of non volatile byproducts that is less than the first set of non volatile byproducts when exposed to the plasma, wherein when the electromagnetic radiation is transmitted to the phosphor material through the barrier window, the temperature is determined from the decay rate of the fluorescent response.

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