



(51) International Patent Classification:
C12Q 1/68 (2006.01) *G01N 33/50* (2006.01)
C12M 1/38 (2006.01)

(21) International Application Number:
PCT/US2011/031750

(22) International Filing Date:
8 April 2011 (08.04.2011)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/322,529 9 April 2010 (09.04.2010) US

(71) Applicant (for all designated States except US): **LIFE TECHNOLOGIES CORPORATION** [US/US]; 5791 Van Allen Way, Carlsbad, California 92008 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **CONNER, Thomas A** [US/US]; 813 Wake Forest Drive, Mountain View, California 94043 (US). **LIM, Chee Kiong** [SG/SG]; Block 313, Sembawang Drive, #06-466, Singapore 750313 (SG). **PALLAS, Michael C.** [US/US]; 408 Oak Avenue, San Bruno, California 94066 (US). **CHING, Chee Wee** [MY/MY]; Number 2, Jalan Belibis 10, Taman Perling, Johor Bahru, 81200 (MY).

(74) Agent: **WONG, Denise H.**; 5791 Van Allen Way, Carlsbad, California 92008 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished upon receipt of that report (Rule 48.2(g))

(54) Title: IMPROVED THERMAL UNIFORMITY FOR THERMAL CYCLER INSTRUMENTATION USING DYNAMIC CONTROL

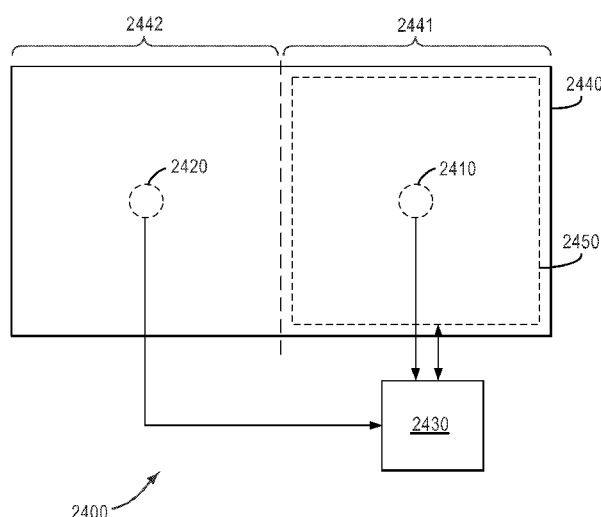


FIG. 24

(57) Abstract: A method for performing polymerase chain reactions (PCR) for improving thermal non-uniformity is provided. The method includes measuring a first temperature, by a first sensor, of a first sample block sector of a sample block and measuring a second temperature, by a second sensor, of a second sample block sector of the sample block that is adjacent to the first sample block sector. The method further includes calculating, by a thermoelectric controller, a difference in temperature between the first temperature and the second temperature and adjusting, by the thermoelectric controller, the first temperature of the first sample block sector based on the difference in temperature by using one or more thermoelectric coolers. The one or more thermoelectric coolers is configured to heat or cool the first sample block sector by adjusting power output from the thermoelectric controller.