

WE CLAIM:

1. An instrument comprising:
a light detection system comprising a CCD sensor and an optical lens system, wherein the light detection system is positioned above a single well at a time in a multi-well plate to conduct an electrochemiluminescence analysis of the single well, wherein the area of the CCD sensor is approximately 1x to 2x of an area of the single well,
wherein the light detection system further comprises a cooling device sized and dimensioned to cool the CCD sensor,
wherein the instrument further comprises a heat removal system comprising at least one fan oriented at an angle to pull heated air exhausted from the cooling device into a flow plenum and out of the instrument.
2. The instrument of claim 1, wherein the optical lens system comprises a plurality of lenses and the plurality of lenses have both spherical and aspherical surfaces.
3. The instrument of claim 2, wherein the area of the plurality of lenses is larger than the area of the single well.
4. The instrument of claim 1, wherein the light detection system is mounted in a substantially vertical direction onto a housing top.
5. The instrument of claim 1, wherein the heat removal system is mounted onto a housing top.
6. The instrument of claim 1, wherein the at least one fan is housed within the flow plenum.
7. The instrument of claim 1, wherein the plenum houses at least one printed circuit board (PCB) and comprises at least one opening to allow electrical connections between the at least one PCB and electrical components outside of the flow plenum.
8. The instrument of claim 7, wherein a flow baffle is positioned within the plenum to minimize recirculation of air within the instrument.

9. The instrument of claim 7, wherein the heated air flows away from the CCD sensor and plate before exiting the instrument.
10. The instrument of claim 9, wherein the heated air further flows across the at least one PCB before exiting the instrument.
11. The instrument of claim 1, wherein the area of the CCD sensor is about 1.25x to 1.85x the area of the single well.
12. The instrument of claim 1, wherein the area of the CCD sensor is about 1.50x to 1.80x the area of the single well.
13. The instrument of claim 1, wherein the light detection system comprises a camera window coated with an anti-reflection (AR) coating.
14. The instrument of claim 13, wherein the light detection system does not have a separate optical bandpass filter.
15. The instrument of claim 13 wherein the camera window is further coated with one or more layers of material to suppress transmission of infrared (IR) wavelengths through the camera window.
16. The instrument of claim 1, wherein the light detection system comprises a light tight enclosure, and the light tight enclosure comprises at least one optical tortuous path to discourage light from entering the light tight enclosure.
17. The instrument of claim 1, wherein the optical lens system comprises fewer than 9 optical lenses and at least five or more optical lenses.
18. The instrument of claim 1, wherein the optical lens system comprises fewer than 7 lenses.
19. The instrument of claim 2, wherein the plurality of lenses form a telecentric assembly.