

E1-58: Locally made colorimeters for education

S Liyanaratne, M Karunaratne, I M N Fernando, S Hewage, S A Fernando

(Dept of Chemistry, University of Colombo, Colombo 3)

Development and utilization of scientific knowledge has increasingly become important in our country. The limitation or lacking of high cost analytical instruments was the major barrier for developments in scientific technology. Therefore it is necessary to develop low cost instruments locally. A low cost

colorimeter was developed based on Light Emitting Diodes(LEDs) with locally available resources.

The major components of the LED based colorimeter are: LED selector, sample holder, detector, detector pre-amplifier, signal amplifier, logarithmic amplifier and a readout device. The cell compartment could occupy up to 8 LEDs (maximum) and any LED can be selected independently. Ebonite block was used to construct the cell compartment. The detector is a single photo diode. Detector pre-amplifier is used in order to amplify the detected signal. The readout device contains an analogue to digital converter. A logarithmic amplifier is employed to convert transmittance to absorbance value. A read out device was constructed to display the response.

Spectrofluorimeter was used to monitor the emission characteristics of LEDs. A brief comparison of emission wavelength maxima for blue, green, orange and red colours for filter and LED type colorimeters are listed in table 1. The bandwidths for each spectrum is shown in brackets. Calibration of the developed colorimeters were performed according to a standard calibration procedure.

Financial assistance by NSF (Research grant RG/95/C/03) is acknowledge.

Table 1: Emission wavelength maxima for different filters and LED type colorimeters.

Colour	Filter λ max (nm)	LED λ max (nm)
Blue	479 (55)	480 (65)
Green	530 (50)	570 (25)
Orange	620 (35)	620 (15)
Red	660 (45)	640 (35)

