Lecture Notes in Electrical Engineering. 6th International Conference on Electrical, Control and Computer Engineering, InECCE 2021, Vol. 842, 2022, pages 407 – 416

An Open-Source, Miniature UV to NIR Spectrophotometer for Measuring the Transmittance of Liquid Materials

Abstract

The primary disadvantages of commercial spectrophotometers are expensive, heavy, and not portable. Furthermore, conventional instruments are only suitable to be used in a specialized laboratory. Even though some commercially available small-size instruments or devices are available, the price is still high. Therefore, a low-cost device is necessary without sacrificing accuracy and sensitivity. In this work, a low-cost, configurable, open-source and accurate portable spectrophotometer device was developed for education and laboratory analytical use. Commercially available photodetector is utilized as main component of the device due to broad spectral range from ultraviolet to near infra-red. The device performs well over a wide range of spectral wavelengths with small errors. We presume that the use of this work can offer a alternative for affordable and accurate device that is comparable to the commercially available products which also suitable for many applications.

Keywords

Miniature spectrophotometer; Open-source; UV to NIR wavelength