Near-infrared Light Source cum Photothermal Device

Introduction

The device utilizes a halogen lamp, optical assembly comprising of lenses & spectral filter element to get Near-infrared optical output of desired centre wavelength and spectral bandwidth through replaceable optical bandpass filters.

There is provision of integrated thermocouples for measuring the temperature of a medium/sample on irradiation (light interaction) and temperature control through synchronised operation of the light source.

Features

- Operational modes: Automatic/ Semi-automatic/ Manual lamp ON/OFF
- Integrated four thermocouples for synchronized temperature data acquisition
- Arduino based control feedback to attain the set temperature
- Timer function / Temperature threshold function to stop the lamp/irradiation
- User interface through keypad and LCD display
- Temperature data acquisition in soft format on a PC through USB interface
- Replaceable optical band pass filters to tune the spectral output
- Special feature: High optical power handling & spectral extraction

Specifications

▪ Light source	: Tungsten halogen lamp (Lamp power ≤ 250 W), air cooled
▪ Output wavelength/Spectral tuning range	: 725-950 nm (Customisable)
▪ Typical optical output power	: 2.5 W (with 795/150 nm optical bandpass filter)
▪ User set parameters	: Time and temperature
▪ Displayed parameters	: Voltage, Current, Run time, Time left and Temperature
▪ Optical output / Output beam diameter	: Fiber coupled (0-22 mm) or free space output
▪ Control & data acquisition	: Arduino interface
▪ Audio – Visual Alarms	: Lamp failure, Process completion
▪ GUI	: 20 x 4 LCD, 4x4 Keypad

▪ Physical size	: 30 x 30 x 27 cm
▪ Input power supply	: 230V, 50 Hz

Applications

- Photochemistry, Photobiology, Life sciences, Plasmonics, Material Characterization
- Biomedical applications: Photothermal therapeutics, Biophotonics, Photomedicine
- Photothermal phenomenon to generate set temperature within a medium/sample
- Excitation source for Microscopy, Spectroscopy and Fluorescence etc.

Status

Present TRL Level – 7

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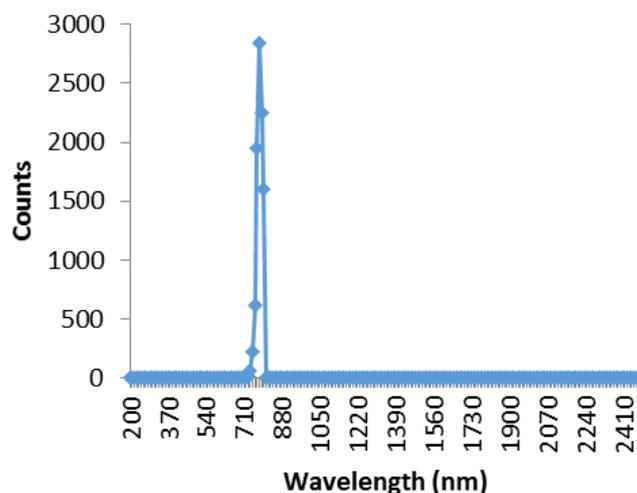
Typical optical output spectra