**Open source multimodal spectroscopy project (OS-MSP)**

**Mid cost operando UV-vis system hardware schematic. Version 1**

Diagram

Description automatically generated**Software compatibility, drivers and details of the hardware will vary over time. I do not take responsibility for incompatibility. Please discuss the hardware and compatibility with your supplier before purchase! Prices are intended as a rough guide only and will vary with time supplier and country!**

1. **Optics**

**Note: I am not including posts and post holders in this schematic as the post hight and type will vary between setups. For every optical component you will need at least one post, post holder and optical mount. Discuss this with your supplier!**

* **You will need either an optical breadboard/enclosure or an optical table. These can be found from a variety of supplies or built yourself. Only thing to keep in mind is to make sure you know if the components you buy have metric or imperial screw threads – DON’T MIX THEM IT WILL DRIVE YOU MAD!**
* **Light source. Any 10 mW stabilised W halogen. I prefer the collimated Thorlabs source SLS201L/M - Stabilized Fiber-Coupled Light Source w/ Universal Power Adapter, 360 - 2600 nm. £840. If you can get a stronger stabilised source do that as you can play with the colour and always attenuate down with neutral density filters.**
* **Collimation optics. Many suppliers will include a collimation package. I use SLS201C - Collimation Package for SLS201L(/M) Light Source £153. You can also use a planoconvex lens as shown in the figure above – the collimation will be better with a specially designed package.**
* **A temprature balancing filter can also come in handy as the emission spectrum of the W lamp is rather red spectrum heavy – this is compatible with the Thor source** **FGT200 - Ø25.0 mm Temperature-Balancing Filter, -160 mireds. £83.25**
* **Collection. I would recommend a wide diameter liquid light guide such as Thorlabs: LLG5-4Z - Liquid Light Guide, Ø5 mm Core, 420 - 2000 nm, 4' (1.2 m) Length. £350. – the length you need will depend on your setup! Don’t bend the light guide more than the stated bend radius – you will attenuate the spectrum and damage the guide.**
* **Refocusing. You will need two mounted planoconvex lenses. I use 5 cm focal length. Mount these on an optical rail. Move the first until you collimate the beam. Move the second until it focuses nicely into the spectroscope and the maximum intensity is reached. I used Edmund optics lenses: 5.0mm Dia. x 5.0mm FL, Uncoated, Plano-Convex Lens.** **STOCK #45-227** **$36.25. The optical rail you buy will depend on the geometry of your enclosure but you will need slightly more than 10 cm to focus the beam. An example that might work is a 250mm Length, Compact Optical Rail** **STOCK #54-928 from Edmund. £124**
* **Spectroscopy. Andor Kymera 193i. You will also need access to the Solis software suite.**
* **Detection. Any deep cooled Camera from Oxford instruments should in principle be compatible. I use an idus 420. Choose a configuration of this that best suits your needs and price. Most spectroscope/detection units from ocean optics will also be compatible but please check with ocean. We used and ocean Maya Pro bought in roughly 2019.**
* **The cost of the above components will vary between countries and times and negotiating skill! To give you an idea we bought an iDus and Kymera together with Solis for about £30k**
* **Potentiostat – currently compatible with IVIUM Vertex potentiostats (£8-9k). After experience cannot recommend them on the basis of customer service, performance, value or reliability. Compatibility with Biologic is a priority for future development. Cost**