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**Electronic Supplementary Information**

# Infrared photo-initiated fabrication of monolithic porous layer open tubular (monoPLOT) capillary columns for chromatographic applications

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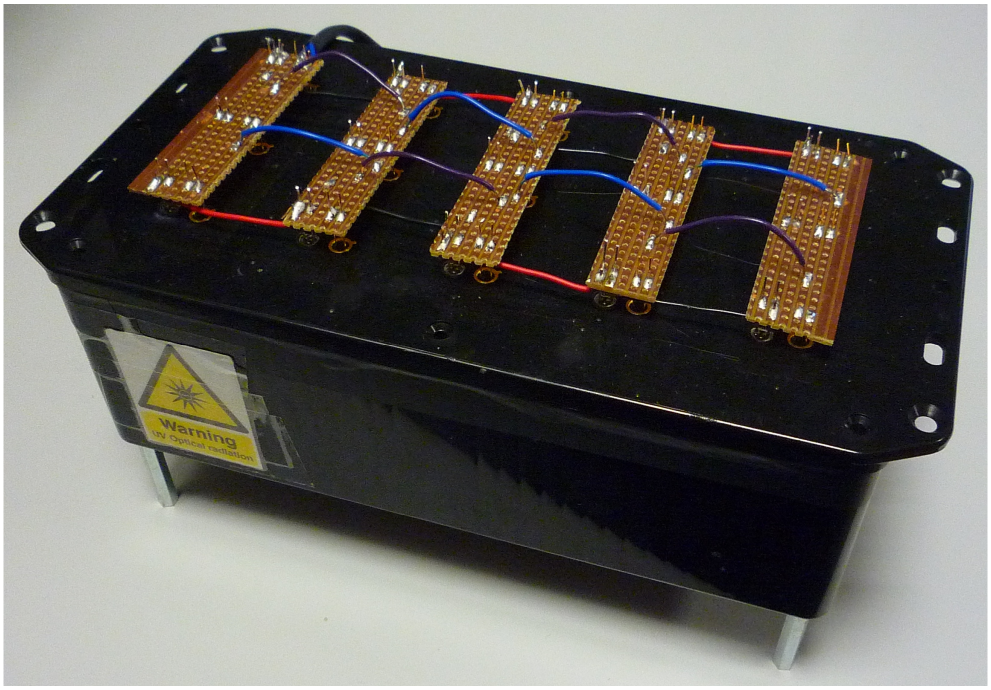
Two prototype IR reactors were used for the IR photo-polymerisation of PLOT columns in this work. Both IR reactors used IR LEDs. The first IR reactor comprised 30 LEDs, each with a wavelength of 830 nm, see Fig. 1. LEDs were chosen as a light source as they are available in many different wavelengths, they are cheap, and although providing less optical power compared with bulbs, their intensity may be varied or indeed the light can be pulsed; using bulb light sources neither of these is possible. The reactor was constructed from a standard electrical acrylonitrile butadiene styrene (ABS) enclosure with dimensions of 190 x 110 x 65 mm and allowed both static and flow-through polymerisation. This IR oven was capable of supplying 1.8 – 2.4 mW/cm$^2$ of IR light at 830 nm.



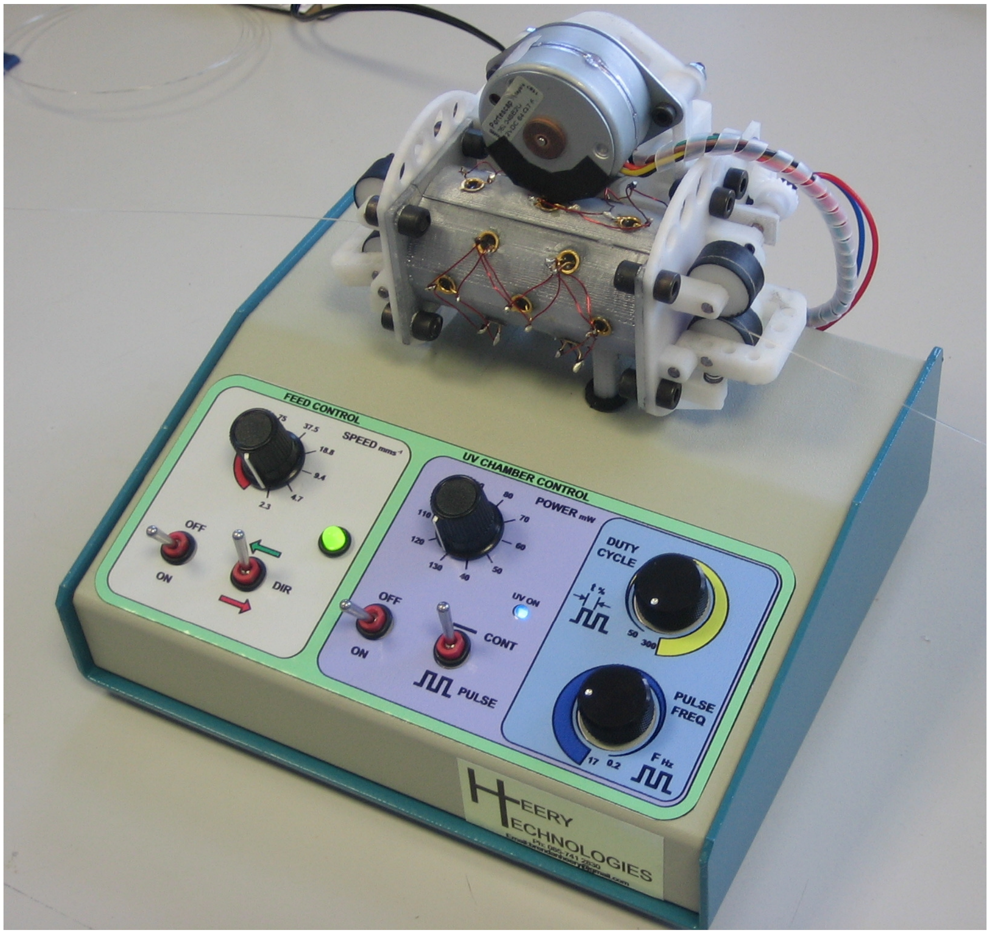

**SI Fig. 1** Exterior of UV/IR oven.

The inside of the oven (Fig. 2) was lined with aluminium foil in order to provide highly reflective surfaces and improve homogeneity of light intensity in the centre of the box. However, this arrangement proved to be problematic during polymerisation as the majority of the incident light was above and below the capillary resulting in a non-uniform polymer layer structure.

**SI Fig. 2** Interior of UV/IR reactor.

Small apertures were made in the centre of each side of the reactor for the introduction of the capillaries into the chamber and for supporting capillaries equidistant from the light sources in order to ensure as homogeneous irradiation as possible. This oven was developed as a proof of principle device and precursor to the feed through oven.

A prototype feed-through UV/IR curing oven was designed and built for the fabrication of monoPLOT columns of variable length and phase thicknesses (see Fig. 3). The design of the oven unit takes into consideration the different media that may be polymerised through both UV and IR initiation, i.e. capillary columns etc., thus it was necessary to provide a means by which capillary columns of extended length may be polymerised, such as columns that may be used in GC. The oven uses a polar array of UV and IR LEDs mounted around the circumference of a hollow tube (the reaction chamber), see Fig. 3. These LEDs have a wide viewing angle, meaning that they emit light from the face of the light source at a highly divergent angle. The oven was capable of supplying 12.5 – 16.5 $mW/cm^2$ of IR light at 830 nm and 50 – 172 $\mu W/cm^2$ of UV light at 365 nm.




**SI Fig. 3** UV/IR oven showing chamber, feed mechanism, and control unit.