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# Thiol-ene thermosets exploiting surface reactivity for layer-by-layer structures and control of penetration depth for selective surface reactivity.

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*Thiol-ene thermosets have been shown to be an efficient platform for preparation of functional polymer surfaces. Especially the effectiveness and versatility of the system has enabled a large variety of network properties to be obtained in a simple and straight-forward way. Due to its selectivity, various thiols and allyl or other vinyl reactants can be used to obtain either soft and flexible[1] or more rigid functional thermosets[2]. The methodology permits use of etiher thermal or photochemical conditions both for matrix preparation as well as for surface functionalization. Due to excess reactive groups in the surface of thiol-ene thermosets, it is possible to prepare surface functional thermosets or to exploit the reactive groups for modular construction and subsequent chemical bonding. Here a different approach preparing monolithic layer-by-layer structures with controlled mechanical properties across freestanding samples is presented. The appraoch is further exploited for preparation of surface structures down to features of 25 μm scale by use of an absorber and simple masking.*

*The combination of masking and absorbers were similarly used to prepare a reactor with controlled surface properties as shown in Figure 1. Here fully sealed reactors (Figure 1a) were prepared modularly by a combination of thiol-ene and thiol-epoxy curing reactions. The reactors were functionalized in different patterns on the top side of the assembled reactor, illustrating the effectiveness of absorbers in controlling the penetration depth and surface grafting. The methodology was used for surface immobilization of enzymes providing a direct link between the distribution of enzymes on the surface and the activity of the reactor.*

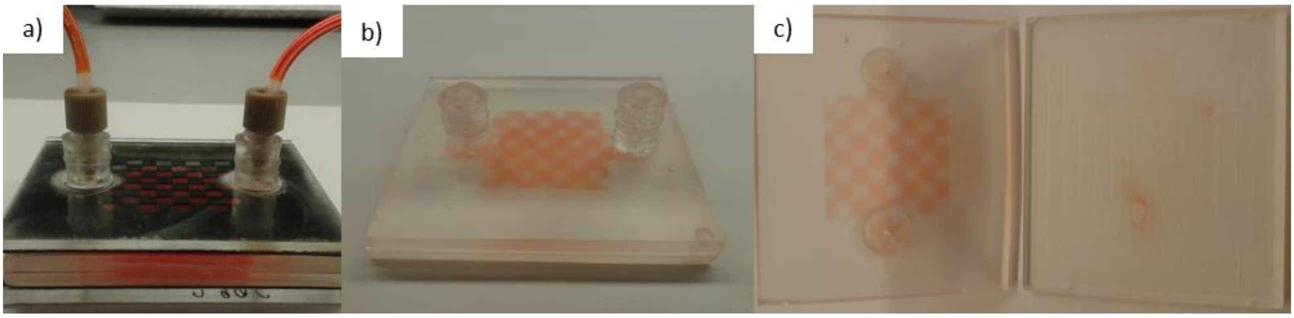


*Figure 1: Surface functionalization inside a flow reactor with an allyl-disperse red, taking place only on the top face of the reactor; a) Assembled reactor during surface functionalization; b) Reactor after surface functionalization; c) Opened reactor showing top and bottom of the reactor, where only the top has been reacted (eventhough both sides have reactive thiols).*

*References*
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