Abstract No: 84 ***Physical Sciences***

MICRO-PATTERN TRANSFER USING EPOXY-RESIN COMPOUND AS AN ALTERNATIVE TO POLY-DIMETHYLSILOXANE

W.D.G.M. Senarathna and S. Jayawardhana*

Department of physics, University of Sri Jayewardenepura, Nugegoda, Sri Lanka
**sasanijay@sci.sjp.ac.lk*

Lithographic techniques provide tools with which micro-nano patterns can be transferred from one surface to another. This is highly beneficial in fields such as the development of superhydrophobic surfaces, semiconductors, and microfluidic devices. Soft lithography is an increasingly popular sub-technique that enables the replication of microstructures to and from flexible membranes, materials, and surfaces. Nevertheless, polymer double casting is a cumbersome procedure requiring additional treatment for anti-adhesion of the moulds and replicates. Here, we present an alternative material using commercially available epoxy resin for soft lithographic nano/micro-scale patterning. The negative mould was created by mixing the silicon and catalyst materials at a ratio of 100:2 by weight and allowed to dry. The epoxy resin was then mixed with the hardener at a ratio of 3:1 by weight and poured into the negative mould. The hardened epoxy resin was later peeled off to obtain the replication. The process was demonstrated using three natural plant species as master templates. They were taro (*Colocasia esculenta*), lotus (*Nelumbo nucifera*) and canna (*Canna coccinea*). The nano/microstructures of natural leaves and their replicates were characterized using scanning electron microscopy and contact angle measurements. It is crucial to notice that the non-wetting properties of the replicates were significantly lower than their original counterparts. Nonetheless, a comparison of the surface images revealed that the micro pattern of the original sample had been successfully transferred to the replicate. The replication approach presented here represents a simple and economical alternative method for the micro-replication of natural surface structures.

Keywords: Epoxy resin, Silicon rubber, Soft lithography, Superhydrophobicity