

The collaboration research for the Dual Graduate School between VNU and JAIST

[Title of collaboration research]:

Micro-fabrication of self-assembled monolayers (SAMs) by irradiation of femto-second laser light

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[Reference home-page address]:

[Other references]:

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1. Purpose

Recently, a micro liquid process has been proposed as a new method to make organic electronic device. In this method, small liquid particles of functional organic materials are directly deposited on a substrate by using inkjet printing technology. In order to place liquid particles at designated position precisely, pretreatment that hydrophilic patterns form on a hydrophobic substrate surface is required. To make fine hydrophilic patterns is one of the most important technologies for the micro liquid process. In this study, we develop a new technique to make fine hydrophilic patterns by using irradiation of femto-second (fs-) laser light.

2. Method

A hydrophobic surface is prepared by forming self-assembled monolayers (SAMs) consisting of fluoro-organic molecules on a substrate. Output light from a fs-laser is focused on the substrate surface through an objective lens of an optical microscope. Due to the multi-photon absorption of the fs-laser light, SAMs is decomposed so that hydrophilic part is exposed as shown in Fig. 1. In this case, fabrication size is expected to be smaller than optical diffraction limit by nonlinear optical effect. After irradiation of the fs-laser light, small liquid particles are deposited by LSMCD (Liquid Source Misted Chemical Deposition) method. Fabrication size and surface morphology are evaluated by optical microscopy and atomic force microscopy (AFM).

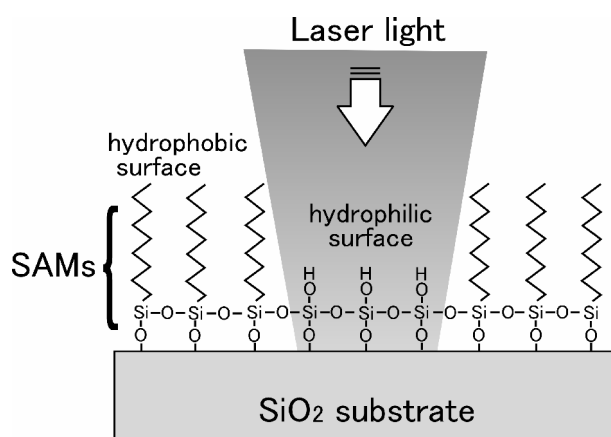


Fig. 1: Fabrication of SAMs by laser light irradiation.