

Edge transfer lithography of V_2O_5 nanowires on SiO_2 substrate

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We have transferred V_2O_5 nanowires to a desired position on a SiO_2 substrate by a μ -contact printing (MCP) technique. In MCP procedure on the aminopropyltriethoxysilane (APS) - treated SiO_2 substrate, we showed that the hydrophilicity of PDMS stamp affects the transfer mechanism of nanowires. The V_2O_5 nanowires were transferred through a relief side of the hydrophilic stamp whereas they were along the recess edge of the hydrophobic one forming agglomerated nanowire patterns because V_2O_5 nanowires do not adhere on the relief sides but are stored in the recess region of the hydrophobic stamp. The width of the transferred pattern could be controlled by the concentration of nanowire solution as well the width of the recess area in the patterned stamp. In this way, we could obtain the reduced line pattern of sub-micrometers compared to the PDMS stamp patterns of a few micrometer sizes. These results suggest that the transfer mechanism of V_2O_5 nanowires on SiO_2 substrate be related to chemical interaction between the stamp and the ink.