

Direct patterning of V_2O_5 nanowires on SiO_2 substrate by using μ -contact printing technique

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Extensive attention has been paid to the field of nano-fabrications due to their high potential in future nano-device technology. Synthesis of right nano-materials and their alignment at specific positions are the two major concerns, which should be solved for the real application. In this experiment, 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 transferred along the recess edge of the hydrophobic one forming a percolated network. The width of the transferred pattern could be controlled by a concentration of nanowire solution and drying time. These results suggest that the edge transfer mechanism in MCP process be related to chemical interaction between the stamp and the ink. In addition, the electrical conductivity of the percolated network of V_2O_5 nanowires was measured.