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Low Resistance Interfacing of Single-Crystal Gold Nanowires
BIROL OZTURK, Oklahoma State University, TETSUYA D. MISHIMA, University of Oklahoma, DANIEL R. GRISCHKOWSKY, BRET N. FLANDERS, Oklahoma State University — We have developed an innovative approach to growing individual, single-crystal gold nanowires between targeted points on lithographic electrodes from simple salt solutions. This approach has allowed us to address a fundamental problem in nano-device-fabrication: the interconnecting of nanowires with external circuitry. That is, we have developed a Labview program which simultaneously controls a function generator and a sourcemeter. This program modulates the growth-inducing voltage to attain low contact resistances between gold nanowires and lithographic electrodes. Four-probe measurements revealed that the contact resistances of the electrode-nanowire-electrode assemblies are consistently less than 25 Ω. To our best knowledge, the sub-25 Ω contact resistances are the smallest that have been attained by any single-step nanowire growth and interfacing approach. Thus, gold nanowires grown with this method are ideal for use as conducting lines in nanoelectronic and nanobiological applications.

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