Simple fabrication of ZnO nanowire field effect transistor using conventional semiconductor processing

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ZnO nanowires are considered as one of the most important semiconductor nanomaterials due to a wide band gap (3.37 eV), large exciton binding energy (60 meV), high thermal and mechanical stability. In this work, we fabricated ZnO nanowire field effect transistor (FET) using a single step of photolithography instead of electron-beam lithography and focused-ion-beam lithography. For this work, single crystal ZnO nanowires were prepared by vapor transport method. The ZnO nanowire FETs showed good electrical characteristics with an estimated transconductance 7-15 nS and mobility 5-20 cm^2/Vs. We propose that our technique is one of the most powerful methods to obtain the semiconductor nanowire FETs.