

### High On-Current Polyhedral Type Field Effect Transistors with Laterally Grown ZnO Nanorods

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Field effect transistors (FETs) containing polyhedral structures (i.e., circle-, square- and triangle-type geometries) with active layers of laterally grown ZnO nanorods have been studied. This method enables us to directly, selectively grow the ZnO nanorods in lateral direction between source and drain electrodes by a simple solution method with eliminating vertical growth components and complex structural networks. Current-voltage (I-V) properties measured through the gate infer that laterally grown ZnO nanorods active channel is n-type. The circle, square and triangle type FETs based on the laterally-grown ZnO nanorods showed mobilities of 13~ 16 cm<sup>2</sup> V<sup>-1</sup> S<sup>-1</sup> and on/off ratios of 3.6 x 10<sup>3</sup>~1.78 x 10<sup>4</sup>. More importantly, polyhedral type FETs showed a large drain-source on-current performance of ~1 mA. The polyhedral type FETs fabricated in this work showed a much better performance than the previously reported solution-based ZnO FETs. These devices open up a new range of applications for laterally-grown ZnO FETs where larger current has to be switched.