Electronic supplementary information

Three-dimensional AlN microroses and their enhanced photoluminescence properties

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Experimental section.

This novel morphology was found in the sample produced by direct nitridation of the aluminum metal in direct current arc plasma with N_2 as the working medium. In our case, aluminum (purity 99.999%) metal and N_2 gas (purity 99.999%) were used as the reactants. An aluminum column was used both as the evaporation source and as the deposition substrate. Before the direct current arc was ignited, the chamber pressure was evacuated to less than 1 Pa, and then working gas was introduced into the chamber. The N_2 pressure is at 30 kPa. When the direct current arc was ignited, the input current was maintained at 110 A and the voltage was a little higher than 30 V. In the plasma, the process of the nitridation involves the evaporation of aluminum, decomposition of N_2, and nucleation of AlN. After growth for 120 min, the substrate was covered by a gray-colored crust. Finally, the products were passivated for about 24 h in pure Ar gas at 80 kPa.

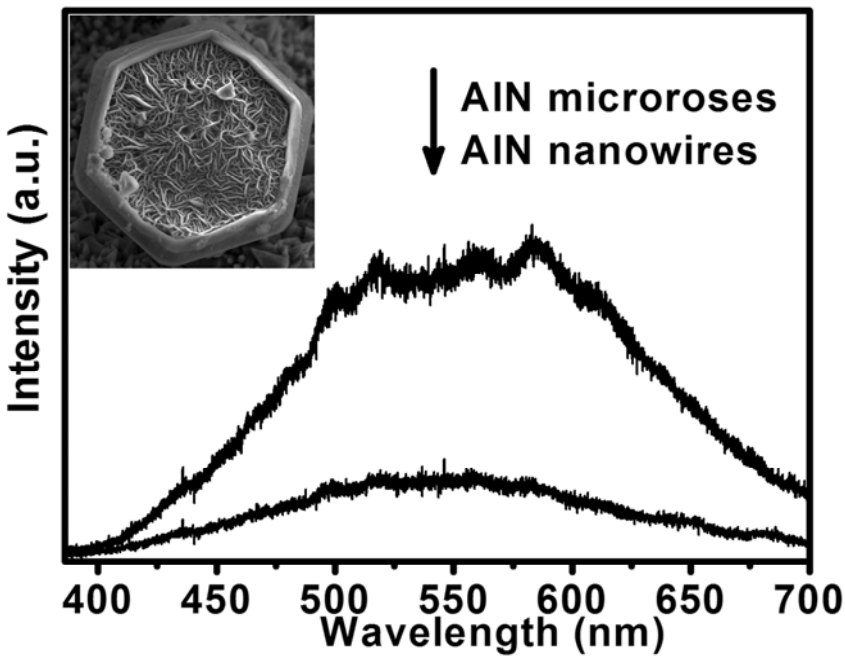

Fig. S1. PL spectrum of the annealed AlN microroses and nanowires. The inset is the FE-SEM image of the annealed AlN microrose.