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Selective area growth behavior of ZnO nanorod arrays in hydrothermal synthesis

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ZnO nanorod arrays have become to attract much attention because the uniform and symmetry of ZnO nanorods can provide great optical and electrical potential in many nanodevices. Here, we have controlled nucleation sites using electron beam lithography technique and grown ZnO nanorods via hydrothermal synthesis to observe growth behaviors. We have measured diameter of nanorods and density of each aperture area. The results presented that the aperture size and distance between adjacent apertures strongly affected the growth of ZnO nanorods such as nucleation layer and growth rate. There is no nanorod grown on the aperture area when aperture size is large and distance between apertures is small. On the other hand, there are several nanorods grown through large aperture size with large distance between apertures. These phenomena show the growth behavior of ZnO nanorods corresponding to the different aperture sizes and distances. This is very useful to enhance the properties of ZnO nanorods and also can achieve high performance of nanodevices.

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