

Self-Assembly of CdTe Nanoparticles into Nanowires under Dark Condition

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Cadmium telluride (CdTe) nanowires were successfully synthesized from individual nanoparticles via self-assembly, and the evolutionary process was investigated. The oxidation of tellurium ions in CdTe nanoparticles under dark conditions led to the assembly of straight nanowires made of several layers of individual nanoparticles. Transmission electron microscopy and scanning electron microscopy were performed to characterize the synthesized nanostructures. The length of the NWs assembled from CdTe NPs ranged from 0.5 to 30 μm . Unlike generally prepared NWs, these NWs were made from individual NPs layered on top of each other. Remarkably, the assembly of individual NPs formed bundles during the intermediate steps before they unraveled into individual NWs. Both control of the amount of stabilizer and oxidation of Te ions acted as driving forces to form NWs. Thus, small modifications in synthesis yielded a major difference in the final nanomaterial structure.