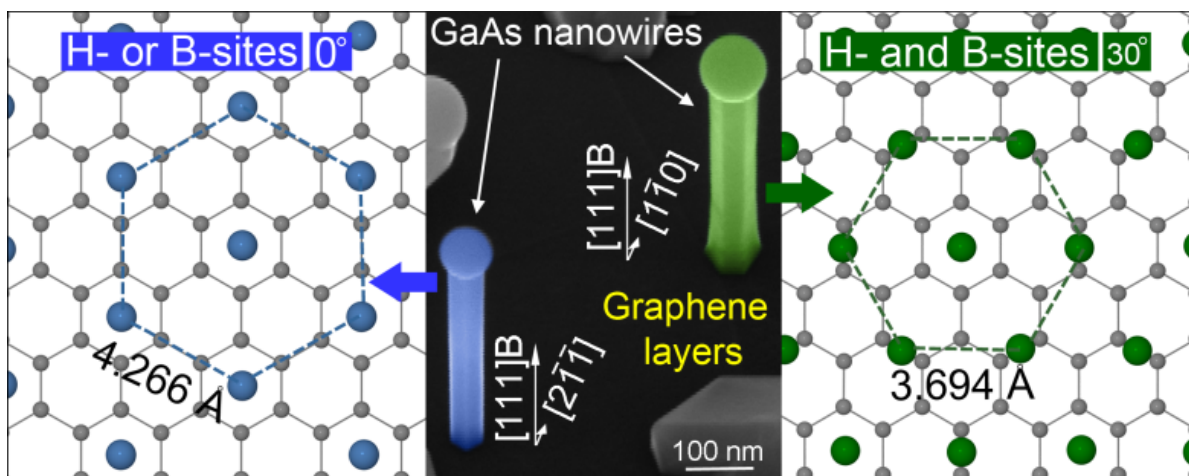


Epitaxial growth of vertical nanowires on graphene

By utilizing the reduced contact area of nanowires, we have shown that epitaxial growth of a broad range of semiconductors on graphene can be achieved. A generic atomic model is established which describes the epitaxial growth configurations applicable to all semiconductor materials. The model is experimentally verified by demonstrating the growth of highly uniform self-catalyzed GaAs nanowires on graphite and graphene by molecular beam epitaxy as shown in the figure above. Due to the catalyst-assisted growth technique used the nanowires are found to have uniform cross-sections. A prototype of a single GaAs nanowire photodetector demonstrates a high-quality material with no degradation due to the growth on the graphene substrate. We anticipate these semiconductor nanowire/graphene hybrid structures to be promising for various novel electronic and optoelectronic devices.



Vertically aligned GaAs nanowires on graphite and graphene: Generic model and epitaxial growth, A.M. Munshi, D.L. Dheeraj, V.T. Fauske, D.C. Kim, A.T.J. van Helvoort, B.O. Fimland, and H. Weman, **Nano Letters** 12, 4570 (2012).