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Selective Graphitization of Silicon Carbide: Effect of Argon Background Pressure and Transport Measurements on the Epitaxial Graphene FARHANA ZAMAN, MIGUEL RUBIO-ROY, YIKE HU, CLAIRE BERGER, MICHAEL MOSELEY, JAMES MEINDL, WALT DE HEER, Georgia Institute of Technology — Electronic quality epitaxial graphene has been selectively grown on SiC in areas not capped by aluminum nitride (AlN). The argon (Ar) pressure during growth is an important parameter for the selectivity of the graphitization process. Atmospheric pressure inhibits growth even in non-capped regions, while high vacuum allows growth over the entire surface. With an intermediate Ar pressure of 100 Pa for 20 min, the molecular-beam epitaxial (MBE) AlN withstands high graphitization temperatures of 1420°C inhibiting graphene growth under it. Graphene hall-bars were successfully fabricated using this method with no exposure of the graphene to external chemicals, such as resists and etchants that deteriorate the performance of graphene. The hall-mobility measured is about 600 cm^2/Vs, which can be further enhanced by fine-tuning the Ar pressure and improving the quality of SiC surface prior to graphitization.

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