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Hydrogen etching and graphitization of 4H- and 6H-SiC XUEBIN LI, ZHIMIN SONG, TIANBO LI, CLAIRE BERGER, PHILLIP FIRST, WALTER DE HEER, Georgia Institute of Technology — Hydrogen etching and graphitization on the surfaces of 4H/6H-SiC with different off-axis angles were studied at temperatures ranging from 1300-1600⁰C. Above 1500⁰C, the scratches caused by polishing on the surfaces of SiC were effectively removed by the reaction with hydrogen. AFM images showed various topographies on the surfaces of 4H/6H SiC after hydrogen treatment, related to wafer type (4H or 6H), polar faces (Si- face or C-face), off-axis angles, and inherent substrate defects. Flat thin graphite films were grown by the thermal decomposition of SiC at high temperature on both C- and Si- faces of SiC in a vacuum furnace. Surface graphitization of 4H/6H SiC previously flattened by hydrogen etching was analyzed in UHV by LEED and AES, and in ambient air by AFM. Mobility of graphite films grown on the C-face of 4H-SiC ranges from 1000 to 10,000 cm²/Vs. Magnetotransport of the graphite film shows 2D gas behavior, accompanying with SdH oscillations and Hall plateaus.

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