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Growth of Graphene by Catalytic Dissociation of Ethylene on CuNi(111)[1] PARUL TYAGI, TYLER MOWLL, ZACHARY ROBINSON, CARL VENTRICE, University at Albany-SUNY — Copper foil is one of the most common substrates for growing large area graphene films. The main reason for this is that Cu has a very low carbon solubility, which results in the self-termination of a single layer of graphene when grown using hydrocarbon precursors at low pressure. Our previous results on Cu(111) substrates has found that temperatures of at least 900 °C are needed to form single domain epitaxial films. By using a CuNi alloy, the catalytic activity of the substrate is expected to increase, which will allow the catalytic decomposition of the hydrocarbon precursor at lower temperatures. In this study, the growth of graphene by the catalytic decomposition of ethylene on a 90:10 CuNi(111) substrate was attempted. The growths were done in an ultra-high vacuum system by either heating the substrate to the growth temperature followed by introducing the ethylene precursor or by introducing the ethylene precursor and subsequently heating it to the growth temperature. The growth using the former method results in a two-domain epitaxial graphene overlayer. However, introducing the ethylene before heating the substrate resulted in considerable rotational disorder within the graphene film. This has been attributed to the deposition of carbon atoms on the surface at temperatures too low for the carbon to crystallize into graphene.

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