Abstract Submitted
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A study of graphene nucleation density on supported thin solid copper films[1] SHANTANU DAS, JEFF DRUCKER, Arizona State University — We report the controlled growth of graphene on 1.25 μm Cu films sputter-deposited on tungsten employing a cold-wall CVD method. The supported Cu films were resistively heated to 1000^{o}C at a chamber pressure of 700 Torrs. Precursor flow rates of 7, 1000 and 10,000 sccm for CH_4, H_2, and Ar were employed. For the range of growth times investigated, 7-12 mins, the graphene films comprised isolated, single layer, hexagonal nuclei as determined by scanning electron microscope and Raman spectroscopy. The nucleation density vs. time profile comprises an initial regime of the first 6 mins of growth during which no graphene is observed indicating undersaturated C concentration on the Cu surface. Supersaturation is reached near 7 mins, when the first graphene nuclei are observed with a density of $3.5X10^5/cm^2$. The graphene nucleus density rises during 8-10 mins and reaches its saturation value of $1X10^6/cm^2$. A well-defined plateau was evident for the next 3 mins during which the average diameter of the graphene flakes increased from 3.6 to 4.6 μm. Finally, continued growth of the isolated nuclei leads to impingement and eventual formation of a complete graphene layer.

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