

Targeting the Mass Production of CVD Graphene

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For graphene industry, mass production of high quality graphene itself is the starting point and finally determines its future. Since 2008, we have been focusing our emphasis on the chemical vapor deposition (CVD) growth of graphene materials. Our work follows two different lines, CVD growth of graphene on metals including Cu, Ni and Cu-Ni alloys, and direct growth on insulators including traditional glass and glass fibers. All the efforts are targeting commercial level mass production together with equipment design and manufacturing. Listed in the following are the current status of our CVD graphene research: (1) 4-6 inch single crystal graphene wafers on Cu(111) and Cu₉₀Ni₁₀(111)/sapphire, commercial batch production available in 10,000 wafers/year; (2) A3-size graphene films with mm single crystalline domains by static growth, commercially available in 10,000 m²/year; (3) A3-size superclean graphene films with CO₂ post-etching technique, commercially available in 10,000 m²/year; (4) roll-to-roll graphene films with 20-micrometer single crystalline domains by dynamic growth technique, commercially available in 20,000 m²/year; (5) 30 x 30 cm² super graphene glass, commercially available in 5000 m²/year; (6) graphene-coated glass fibers and fabrics by direct growth technique with a capacity of 5000 m²/year. All the CVD systems are home-built with scaling-up capacity for commercialization. The talk will give a brief overview of our over 10-year efforts from fundamentals to mass productions.