

# **Towards large-area monocrystalline graphene:**

## **Growth and observations**

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Grain boundaries in graphene are formed via the stitching of islands during the initial growth stage, and these boundaries govern transport properties and related device performance. Graphene can be ideally grown from a single nucleation seed, but its growth to large-area graphene can be terminated by several unknown self-limiting growth factors. Another approach is to start with numerous nucleation seeds and allow them to grow and coalesce together to produce large-area graphene. However, graphene grain boundaries (GGBs) are inevitably formed via stitching of graphene flakes, consequently limiting the graphene quality. We will describe several growth factors to achieve monocrystalline graphene growth during CVD. Another issue is how to confirm grain boundary-free large-area graphene in centimetre scales. We will present several methods of identifying monocrystallinity of graphene in large area together with local transport phenomena at the grain boundaries.