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Raman spectral indicators of catalyst decoupling for transfer of CVD grown 2D materials

Through a combination of monitoring the Raman spectral characteristics of 2D materials grown on copper catalyst layers, and wafer scale automated detection of the fraction of transferred material, we reproducibly achieve transfers with over 97.5% monolayer hexagonal boron nitride and 99.7% monolayer graphene coverage, for up to 300 mm diameter wafers. We find a strong correlation between the transfer coverage obtained for graphene and the emergence of a lower wavenumber 2D peak component, with the concurrent disappearance of the higher wavenumber 2Dþ peak component during oxidation of the catalyst surface. The 2D peak characteristics can therefore act as an unambiguous predictor of the success of the transfer. The combined monitoring and transfer process presented here is highly scalable and amenable for roll-to-roll processing.

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