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Substrate dependence of the cyclotron resonance on large-area CVD graphenes

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We have investigated cyclotron resonance on single-layer large-area graphemes on different substrates. Single-layered large area graphene samples used for this study was synthesized by chemical vapor deposition. Absorption peaks of the cyclotron resonance are clearly observed on graphene samples. The peak energies exhibit $\sqrt{B}$ -dependence in terms of an unequally spaced Landau Level structure in Dirac fermions. We find significant substrate dependence of the band velocity $\tilde{c}$. The derived $\tilde{c}$ of the sample on a GaAs substrate is enhanced by about 10% from that on a glass substrate, which almost coincides with that of the multi-layer epitaxial graphene, indicating that the $\tilde{c}$ is strongly affected by the condition of the substrate.