

Radio frequency transmission characteristics of graphene under low temperature

Sun Jun Kim, Seongchan Jun*

School of mechanical Engineering, Yonsei University, 50 Yonsei-ro, Seodaemun-Gu, Seoul 120-749, Republic of Korea
sci@yonsei.ac.kr

Abstract

Graphene, a two dimensional honeycomb lattice of carbon atoms with 0.335 nm thickness, has attracted great attention because of its good electric properties, flexibility and stability.^{1,2} Especially, its superior properties show remarkable potential for radio frequency (RF) applications.³ Although there were many electronic device researches, these studies based on frequency has not been much progressed in.

In this study, we prepared ground-signal-ground (GSG) devices of graphene interconnectors for RF transmission with two-port measurements in the high frequency range from 2 to 10 GHz. From the investigation of RF transmission, we demonstrated the electrical characteristics according to temperature from 100K to 300K. Furthermore, using telegrapher's equations with equivalent circuit model, parameters such as impedance, resistance (R), inductance (L), shunt conductance (G), and shunt capacitance (C) were extracted from the RF transmission results for demonstrating effect of thermal energy. The result of this study is expected to suggest the achievability of identifying a graphene-based RF transmission device with temperature.

References

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Figures

