

Emerging technologies for future THz car sensors and networks

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Nowadays, sub-THz region of electromagnetic radiation spectrum is largely explored, mostly concerning future applications in wireless communication systems. One of the ideas is to utilize sub-THz car radar sensor technology to improve passenger and car safety.

In recent years, graphene grown on silicon carbide has been attracting attention due to its potential applications in mm-wave electronics. For example, it was shown that epitaxial graphene on SiC can be used in monolithic microwave integrated circuits (MMICs) operating at high frequencies (80–100 GHz) [1]. The reason for perceiving graphene as a promising candidate for applications is the fact that as a material, graphene/SiC is flexible and tuneable in terms of electron transport properties. Possibility of controlling (at a certain range) the number of layers as well as carrier concentration and mobility can be obtained during the growth processes.

Here we present graphene/SiC wafer-scale technology oriented towards graphene MMICs application. Graphene technology is being realized using different techniques and equipment depending on the final application. Graphene is grown on semi-insulating SiC (up to 4" wafers) by CVD or Si sublimation methods, which enables a direct electronic devices application [2]. Graphene/SiC based THz MMIC emerging technology is followed by other 2D materials.

What is important, the growth of graphene is being carried out using both R&D and production type systems, both prototypes and commercially available ones.

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References

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