STUDY OF GRAPHITE COMPOSITES FOR DIFFRACTIVE TERAHERTZ OPTICS NEEDS

Rusnė Ivaškevičiūtė[1], Jonas Zinkevičius[1], Lukas Laurinavičius[1], Rasa Pauliukaitė[1], Jan Macutkevič[1], Gintaras Valušis[1]

[1] Center for Physical Sciences and Technology, Lithuania
rusne.ivaskeviciute@ftmc.lt

One of the important topics in terahertz (THz) science and technology is to reveal routes for convenient-in-use THz imaging systems and find new ways to control THz radiation using planar solutions [1]. In particular, these issues become essential designing imaging systems using on-chip approach, because metal diffusion cannot be further used as suitable tool to fabricate THz diffractive optics components [2].

In this communication, we consider graphite composites as a possible solution for diffractive THz optics components. Graphite composites with different concentrations of graphite (1%, 2,5%, 5% and 10%) and different number of layers (1, 3 and 9) were fabricated and investigated. Broadband dielectric spectroscopy and electrical techniques (I-V and RLC measurements) were employed to evaluate parameters of graphite composites, such as permittivity and electric conductivity. These results showed that one layer of 2,5% concentration graphite composite is the most promising candidate for creating diffractive THz optic components, because of its highest permittivity.

Moreover, effect of fluctuating potential barriers on carrier transport in graphite composites were considered, theoretical estimates are discussed as well.

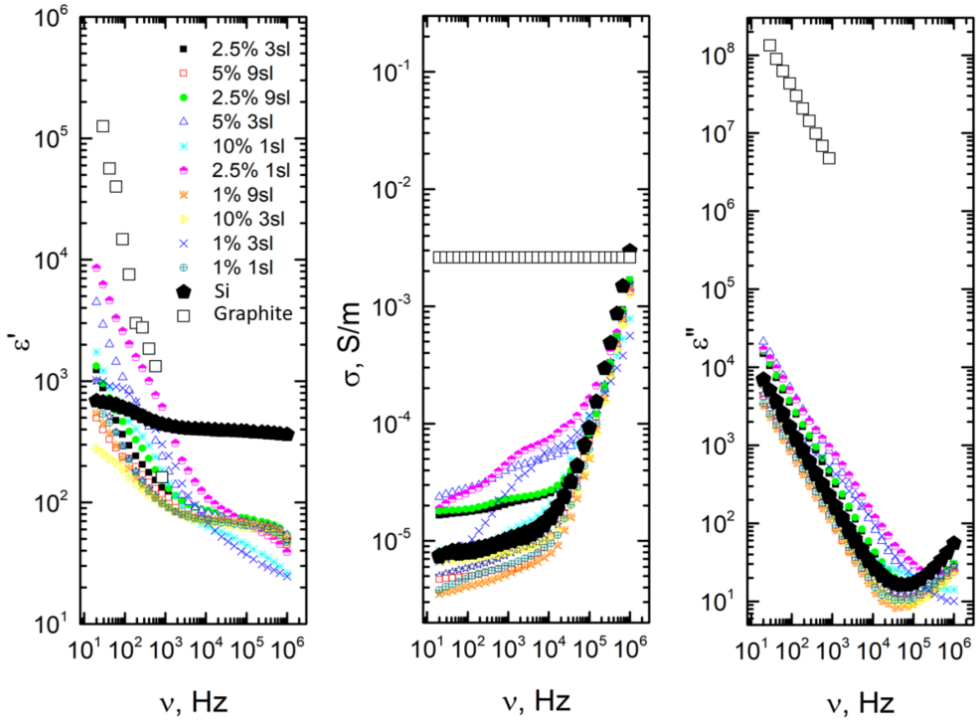

Fig. 1. Permittivity and conductivity of graphite composites with different concentrations

[1] S S Dhillon et al, J. Phys. D.: Appl. Phys. **50** (4), 043001 (2017).
[2] L. Minkevičius et al, JIMT **35** (9), 699-702 (2014).