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## Raman spectroscopy of graphene - based composite

L. Jarosinski[1]*, Cz. Kapusta[1] and A. Rybak[2]

[1] *AGH University of Science and Technology, Faculty of Physics and Applied Computer Science, Department of Solid State Physics*
[2] *ABB Corporate Research Center, Krakow, Poland*

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*e-mail: lukasz.jarosinski@yahoo.pl

Graphene is a 2-dimensional crystalline allotrope of carbon with honeycomb lattice of sp2-bonded carbon atoms [1]. Its composites have recently attracted considerable attention owing to their unusual properties.

Raman spectroscopy is a powerful, non-invasive method widely used for characterisation of interatomic bonds. It is very effective in distinguishing details of bonding and local atomic environments in carbon containing structures. In particular, the information on disorder, surface, grain boundaries, doping and strain can be learnt from the Raman spectrum of graphene and its behaviour under varying physical condition [2]. However, much less research on graphene materials such as graphene-based composites can be found [3].

In this work results of Raman spectroscopic/spectromicroscopic studies of graphene filler - epoxy resin matrix composites are reported. They are discussed in terms of a relation to thermal and electrical transport properties as well as of possible mutual graphene - epoxy resin effects.

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## Extreme ultraviolet irradiation effects on PVDF polymer surface

B. Korczyc[1]*, T.J. Kałdoński[2], I. U. Ahad[1], P. Wachulak[1], J. Kostecki[1], A. Bartnik[1], and H. Fiedorowicz[1]

[1] *Institute of of Optoelectronics Military University of Technology, 2, Kaliskiego Str, 00-908 Warsaw, Poland*
[2] *Faculty of Mechanical Engineering, Military University of Technology, 2, Kaliskiego Str, 00-908 Warsaw, Poland*

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*e-mail: bkorczyc@wat.edu.pl

Extreme ultraviolet (EUV) light, due to its special qualities, can be exploited in various novel biomedical applications. Recent research priorities are to use EUV radiation as a highly efficient surface modification method [1].

In this work EUV irradiation effects in polyvinylidene fluoride (PVDF) thin foil were investigated. PVDF is fluoropolymer with excellent mechanical strength and durability making it suitable for tissue engineering and vascular prostheses applications. It is noteworthy that efficient micromachining of PVDF by direct photo-etching with EUV has been demonstrated for the first time by scientists at MUT [2]. In case of polymers, the penetration depth of EUV photons is limited to a very thin surface layer, while leaving the bulk material properties intact. Penetration depth in PVDF is about 100nm. Taking advantage of this fact fluoropolymer samples were irradiated using a laser-plasma EUV source, based on a gas-puff target excited with the 3-ns/0.8J/10Hz Nd:YAG laser [3]. The spectrum of focused extreme ultraviolet radiation used for samples treatment was in the wavelength range from 5 to 70 nm with relatively narrow peak, centred at about 10 nm wavelength.

The wettability of PVDF has been efficiently tuned as a consequence of a proper combination of surface topography and chemistry, achieved through EUV irradiation. Wettability studies were performed by measuring water contact angle. Significant difference in the angle between pristine and EUV modified PVDF samples, approximately 50 degrees, was obtained. The surface layer morphology was investigated using high resolution scanning electron microscopy.

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