

# POLYMER COMPOSITE MATERIALS APPLICATIONS FOR DYNAMIC STRESS MITIGATION

*RĂZVAN PETRE*<sup>1</sup>  
*NICOLETA PETREA*<sup>1</sup>  
*TEODORA ZECHERU*<sup>1</sup>  
*GHEORGHE HUBCA*<sup>2</sup>  
*OVIDIU IORGA*<sup>1</sup>  
*CELINA DAMIAN*<sup>2</sup>

***Abstract:** Fibre reinforced polymer materials can be successfully used in a wide range of applications and can significantly improve the protection characteristics. The fibres are mainly responsible for the performances improvement (strength and stiffness properties).*

***Keywords:** graphene oxide, nanotubes, dynamic stress.*

Due to the remarkable properties of composite materials, the investigations during the past years regarding the blast resistance properties of polymeric elastomers indicate that they can be successfully used on different armoured transport vehicles. Polymer composite materials (PCM) can be used to mitigate dynamic stress, improve ballistic protection, reduce blunt trauma, etc.

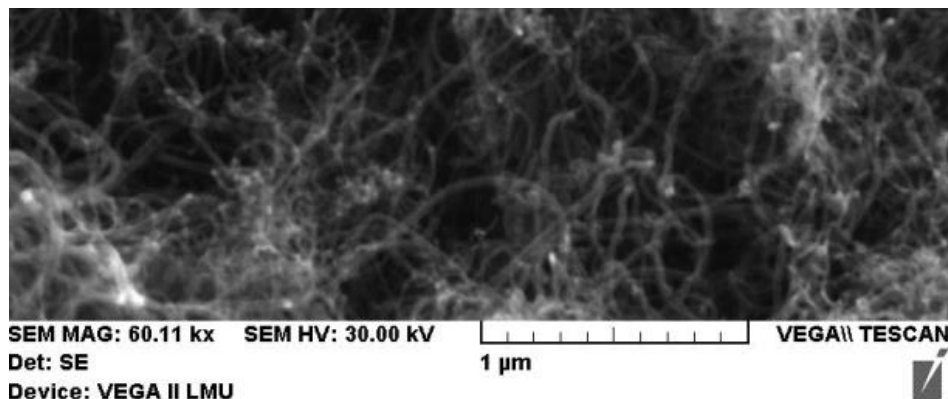
The PCMs considered are composed of polymer matrices reinforced with fibres. The PCMs mechanical and physical properties are clearly determined by their constituent properties and by the micro-structural configuration. While the fibres are mainly responsible for strength and stiffness properties, the polymeric matrix contributes to stress transfer and provides microclimate protection.

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<sup>1</sup> Scientific Research Center for CBRN Defense and Ecology, 225 Olteniței Ave. 041309 Bucharest, Romania, office@nbce.ro

<sup>2</sup> University POLITEHNICA of Bucharest, 1-7 Polizu Str., 011061 Bucharest, Romania

The key constituents that have been considered for PCMs achievement are: polyurea, graphene oxide micro-flakes and functionalized multi-wall carbon nanotubes.



*Figure 1. SEM image of multi-wall carbon nanotubes*

The progress beyond the state-of-the-art consists in producing PCMs with excellent mechanical resistance. Different types of reinforcing fibres with different thickness can be expressly used for PCMs targeted applications, for the following purposes:

- Improving ballistic protection properties of existing equipment;
- Reducing blunt trauma for protection equipments;
- Additional shield for armoured transport vehicles.

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