

Innovative Industrial Materials with Advanced Multifunctionality, Prolonged Lifetime and Improved Performance Against Environmental Conditions for Versatile Protective Equipment

Ioanna K. Sideri,¹ Nikolaos S. Heliopoulos,² Theodoros Zikos,² Dionysios Siamidis,³
Georgios C. Vougioukalakis,⁴ and Nikos Tagmatarchis*¹

¹ *Theoretical and Physical Chemistry Institute, National Hellenic Research Foundation, 48 Vassileos Constantinou Avenue, Athens 11635, Greece*

² *700 Military Factory, Piraeus GR-18648, Greece*

³ *Siamidis S.A., Inofita GR-32011, Greece*

⁴ *Laboratory of Organic Chemistry, Department of Chemistry, National and Kapodistrian University of Athens, Athens GR-15771, Greece*

e-mail: isideri@ie.gr

In a period of increasing threats, military, police, and security staff are assigned tasks that compromise their individual safety. To protect such personnel from occupational hazards, e.g. blunt injuries or injuries from shots and sharp objects, personal body-shielding media are increasingly used¹ and often mandatory by law.

PROTECT project aims at the holistic development of personal body armor, targeting at modifying the existing anti-ballistic Kevlar and Nomex aramid fiber plaques, as well as at the production of innovative textile carrier of anti-ballistic plaques made from modified composite fabric.^{2, 3} The targeted personal body armors will cover the requirements of international standards concerning anti-ballistic protection. Tailor-designed organic molecules and modified carbon-based nanomaterials with multifunctional properties, such as antibacterial, air and water vapour permeability, water repellence, protection against fire and UV radiation and abrasion resistance, will be prepared and assessed, in order to increase the comfort level of those who wear them and their operating time.

References

1. B. Schram, et al, *Int. J. Environ. Res. Public Health* **15**, 893 (2018).
2. M. Rajabian, C. Dubois, *Polym. Composites* **27**, 129 (2006).
3. X. Yang, Q. Tu, X. Shen, P. Zhu, S. Zhang, *Polymers* **11**, 374 (2019).

Acknowledgment

Co-financed by the European Regional Development Fund of the European Union and Greek national funds through the Operational Program Competitiveness, Entrepreneurship and Innovation, under the call RESEARCH-CREATE-INNOVATE (project code: T2EDK-01316).

