Advanced protective materials

Lighter and more resistant materials for enhanced protection

ISL develops novel protection materials and armour systems in order to:

- improve ballistic protection for soldiers and light armoured vehicles
- reduce the weight of structures
- improve the intrinsic characteristics of materials (composition, microstructure, reinforcement, etc.) adapted to specific demands.

Examples

- High-performance multilayer polymer/metal composites with features gradient
- Light particle-reinforced metallic alloys (aluminium, magnesium, etc.)
- High-resistance, high-stiffness, low-weight transparent ceramics

Applications

- Enhanced ballistic protection of airborne, naval, ground and security forces
- Lighter individual equipment and mass reduction of materials
- Lighter windscreens for armoured vehicles

Ultrafine powders metallurgy and sintering allows the manufacturing of micro- and nanocomposites mixing metals and metallic alloys, ceramics and polymers, also in multilayer and particle reinforced composites.

Materials with enhanced ballistic performance can be produced, based on the understanding of the characteristics of materials and the capacity to design customised composites:

- characterisation and modelling of the mechanical behaviour of protection materials under dynamic stress conditions
- identification of behaviour and destruction laws in order to predict the behaviour of these materials when impacted
- tests of materials subjected to ballistic impact