

Transparent ceramics



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From transparent armor to laser materials

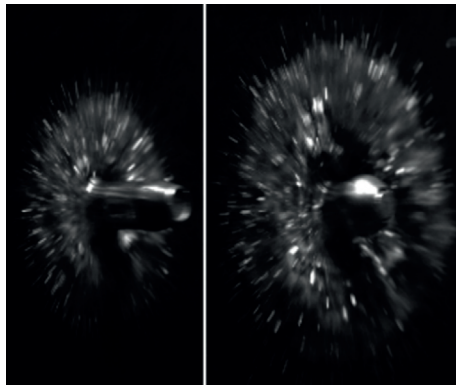
Ceramic armor materials already protect soldiers and platforms **against various ballistic threats**. Increasing material strength and protection capability while reducing weight and layer thicknesses are **current and future challenges**, especially when adding one additional demand: **optical transparency**.

Innovative technologies in powder synthesis, consolidation and sintering allow for **3D engineered materials and material composites** that are **more than the sum of their individual properties**. Control of microstructure and specific doping influences mechanical strength and optical properties, and enables various functions – from armored windows to multi-functional laser materials.

Transparent ballistic armor



Transparent Mg-Al-Spinel



AP impact on ceramic

Doped transparent YAG ($Y_2Al_5O_{12}$) ceramics for lasers



Er³⁺ doped YAG transparent ceramics for high power laser sources



Characteristics

- High strength
- High optical transparency UV-MIR (0.4-5.5 μm)

Applications

- Transparent armor
- Missile domes
- Strong windows
- Lasers:
 - Miniatures designators
 - High-energy laser weapons
 - IRCM lasers

References

- Realized ceramics: Spinel, YAG, Yttria
- Various dopants: Er³⁺, Ho³⁺, Tm³⁺, Ho³⁺, Cr⁴⁺, etc.

12th LCS in St-Louis, France

- Attend the **12th Laser Ceramics Symposium** organized by ISL **28th November – 2nd December 2016 in Saint-Louis, France**

12th Laser Ceramics



Saint-Louis – France



ISL – French-German Research Institute of Saint-Louis

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