



## Optically transparent hard coatings

### Invention

**A nanocomposite thin film coating that is optically transparent in the visible range and has hardness values of up to 30 GPa has been developed and patented. The coating is deposited by a vacuum process in such a way that the stress level remains below 1 GPa. The material is prepared at 200°C by magnetron sputtering without any harmful means and can withstand temperatures up to 1000°C for two hours without alteration.**

### Background

Protecting optically transparent materials like glass and polymers extends their lifetime when exposed to abrasive conditions. The protective coating described can be applied by a vacuum process to most surfaces which are stable in vacuum at 200°C.

### Advantages

The low deposition temperature of 200°C makes it possible to coat a wide variety of transparent materials such as polycarbonates, polyimides and all forms of SiO<sub>2</sub>-based glasses.

### Applications

Various optically transparent objects with large curvatures such as lenses, protective glasses, translucent hoods, various architectural elements etc., may be protected against premature deterioration due to excessive wear. There is a wide range of applications that includes coating of small lenses up to architectural window glasses.



left: glass plates are readily scratched by sandpaper, right: coated glass plates show scratches only after prolonged scratching due to subsurface damages in the glass

## Ownership

Empa, Swiss Federal Laboratories for Materials Testing and Research,  
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## References

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## Keywords

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