

**Nano composites based on nano magnesium fluoride and the perfluoropolymer THV**Clemens Flügel, Erhard Kemnitz<sup>1</sup><sup>1</sup>*Humboldt-Universität zu Berlin, Department of Chemistry*  
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The combination of polymers and magnesium fluoride nanoparticles for inorganic-organic nanocomposites were investigated. The main aim was to increase mechanical strength of perfluoropolymers under preservation of optical properties like the refractive index. The synthesis was carried out at ambient temperatures via the fluorolytic sol-gel process first described by Kemnitz *et al.* in 2003 [1]. This general approach was applied and further developed by Noack *et al.* to magnesium fluoride [2] leading to the first successful syntheses of inorganic-organic nanocomposites based in nanoscaled MgF<sub>2</sub> [3].

In the present work, by modifying the surface of the nanoparticles, a homogenous distribution of the magnesium fluoride nanoparticles inside the polymers of THV (A co-polymer of PTFE-hexafluoropropylene-vinylidene fluoride) was observed and transparent sheets of nanocomposites were obtained. Mechanical tests showed a doubling of the *E* modulus under preservation of elongation and therefore doubling of mechanical strength.

[1] E. Kemnitz *et al.*, *Angew. Chem.* **115** (2003) 4383-4386.

[2] J. Noack *et al.*, *J. Mater. Chem.* **21** (2011) 15015-15021.

[3] J. Noack *et al.*, *Dalton Trans.* **42** (2013) 5706-5710.