

Light interacting with interconnected Nanomaterials: from extreme absorbers to fast sensors

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Almost perfect black and white materials can be created on the basis of highly porous 3D materials from metal oxide semiconductors like ZnO or SnO₂ in a flame transport synthesis [1]. The white appearance originates by the scattering of optical light penetrating the 3D network. Wide band-gap semiconductors like ZnO or SnO₂ are completely transparent in the optical range but very effective scattering materials if produced as micro and nano crystals: The crystalline facets as well as the high refractive indices of the crystalline materials deflect the light. If the metal oxide networks are coated with carbon materials and dissolved subsequently, ultralight weight (porosity up to 99.99% [2]) but extreme black materials are obtained by a combination of scattering and absorption. In the presentation, the fabrication and function of the materials made in the functional nanomaterials group will be shown including their employment as UV sensors [3].

[1] Particle & Particle Systems Characterization **30** 775-783 (2013)

[2] Advanced Materials **24** 3486-3490 (2012)

[3] Advanced Materials **26** 1541-1550 (2014)

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