



International Conference
ADVANCED OPTICAL MATERIALS AND DEVICES

ABSTRACTS

Vilnius
August 28-31, 2011

SEMICONDUCTOR PHYSICS INSTITUTE OF
CENTER FOR PHYSICAL SCIENCES AND TECHNOLOGY



7th International Conference

**ADVANCED OPTICAL MATERIALS
AND DEVICES**

Vilnius, Lithuania
August 28–31, 2011

PROGRAM AND ABSTRACTS

Vilnius 2011

**Program and Abstracts of the 7th International Conference
Advanced Optical Materials and Devices (AOMD-7)
Vilnius, Lithuania
August 28–31, 2011**

Printed from original papers submitted by the Conference participants

**The Proceedings of the Conference will be published
in *Lithuanian Journal of Physics***

ISBN 978-9955-750-09-3

© 2011 Semiconductor Physics Institute of
Center for Physical Sciences and Technology,
Vilnius

SOL-GEL SYNTHESIS OF TiO₂ CONTAINING PHOTOCATALYTIC FILMS

G. Mezinskis

Institute of Silicate Materials of the Riga Technical University, 14/24 Azenes Str., Riga,
LV 1048, Latvia, gundarsm@ktf.rtu.lv

Much study in recent years has focused on the immobilized photocatalytic systems. The electronic structure of TiO₂ determines the formation of photo-generated electrons and holes which can recombine or migrate to the surface of the semiconductor and oxidize adsorbed substances. Due to titania physical and chemical stability, cost, non-toxicity, and resistance to corrosion, oxidation reactions on the TiO₂ have found applications in disinfection, photo-catalytic water and air purification.

Most studied systems for photocatalytic applications are TiO₂ thin film structures which photocatalytic activity strongly depends on the preparing method and post-deposition treatments [1].

Sol-gel technique is one of the main techniques for the development of anatase thin films, since properties of the films can be tailored changing the solution composition and deposition process details.

Recent review papers describe in details mechanisms of photocatalytic disinfection and solar reactors for photocatalytic water treatment [2], solar disinfection parameters [3], and illustrate inherent advantages and general procedures of sol-gel method for the preparation of photocatalysts [4].

The aim of present report is to review the latest literature data analyzing the influence of each sol-gel coating preparation step onto coating structure and properties. The preparation methods of various substrate surfaces to ensure controlled composition and morphology, and less discussed deposition methods will be reviewed too.

Keywords: sol-gel films, substrate surface preparation, photocatalysis.

1. G. Colón-Ibáñez, C. Beliver-Coldeira, and M. Fernández-García, in: *Synthesis, Properties and Applications of Oxide Nanomaterials*, ed. J.A. Rodriguez, M. Fernández-García (John Wiley & Sons, Inc, Hoboken, New Jersey, 2007), p. 506.
2. S. Malato, P. Fernández-Ibáñez, M.I. Maldonado, J. Blanco, W. Gernjak, *Catalysis Today* **147**, 1–59 (2009).
3. J.A. Byrne, P.A. Fernández-Ibáñez, P.S.M. Dunlop, D.M.A. Alrousan, and J.W.J. Hamilton, *Int. J. Photoenergy*, Article ID 798051 [12 p.] (2011) doi:10.1155/2011/798051.
4. Ting Ke Tseng, Yi Shing Lin, Yi Ju Chen, and Hsin Chu, *Int. J. Mol. Sci.* **11**, 2336–2361 (2010).