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Irina Plesco is currently a PhD student at Technical University of Moldova in the field of Physics and Materials Sciences. Her PhD project was structured between TU-Moldova and University of Kiel, Germany in the framework of a scholarship offered by German Academic Exchange Service (DAAD). In the framework of NanoMedTwin project Irina visited the Department of Applied Physics of KTH, Sweden. Her main research focus is on technology of semiconductor growth and characterization. Irina worked on semiconductor based aero-materials fabrication and development of applications in pressure and light sensing, photocatalytic degradation of organic pollutants, and fabrication of liquid marbles.

“Application of 2D and 3D semiconductor nano-architectures for organic dye photodegradation”

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Abstract. In this work we studied the effect of semiconductor nano-architectures on photolysis process of methylene blue (MB). TiO₂ nanotubes, GaN and Ga₂O₃ aero-tetrapods have been investigated. Energy band structure and defect states of these materials extend their applications area in the UV and visible light spectra. Under UV light illumination rutile-anatase TiO₂ nanotubes provide 75% MB degradation in only 10 minutes, at the same time Ga₂O₃ functionalized with Au nanoparticles reaches such degradation rate in 30 minutes and Ga₂O₃ – Pt in 50 minutes. The rutile-anatase TiO₂ nanotubes degrade MB with 65% in 1h under visible light illumination, while other materials do not show significant enhancement on the photolysis. Despite to the higher efficiency of titania nanotubes, advantage of using aeromaterials consists in the possibility to collect and reuse them with the same efficiency as initial material.