

Notice of dissertation defense

21.08.2018

Metamaterials for enhanced energy harvesting in photovoltaic systems

Title	Novel light-trapping structures for thin-film solar cells
Content	<p>Nowadays, wireless telecommunication technologies are developing rapidly. The number of mobile devices, as well as data transfer rate, are growing continuously. The world is moving towards the Internet of Things revolution. However, there are many unsolved problems that hinder the development of technology. One of these critical challenges is energy constraints due to limited battery capacity and lifetime.</p> <p>A great attention is paid to the development of energy harvesting technology i.e. energy recovery, that allows, for example, to create standalone continuously operating devices. One of the promising trends in the modern energy industry related to this technology is Photovoltaics, which is based on the transformation of solar energy into electricity. A special focus is placed on thin-film solar cells with a thickness of the photovoltaic layer less than 1 micron. However, their overall efficiency is still quite low, and the power output is insufficient. Therefore, this technology requires improvements.</p> <p>This research is devoted to the development of novel broadband light-trapping structures based on regular arrays of nanostructures and microstructures often referred in the modern literature as metamaterials. Suggested light-trapping structures offer the gain in the optical efficiency of thin-film solar cells of several types without damaging their operational characteristics.</p>
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