New nanomaterials and heterostructures for energy applications

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The report is devoted to the method of creating functional structures by low-temperature methods with the possibility of scaling them for specific applications. Describes the types of nanostructures and materials that can be obtained by simple chemical and electrochemical methods using the phenomena of self-organization of such structures. Shown are examples of functional nanomaterials that are synthesized at MIET, in particular in the laboratories of the Institute for Advanced Materials and Technologies. Materials and heterostructures based on nanostructured oxides of titanium and tungsten for use in photovoltaics and photocatalysis are considered as examples of functional nanomaterials and their areas of application. Porous silicon for photooxidation of organic compounds, as well as arrays of germanium whiskers as a promising electrode material for metal-ion batteries.