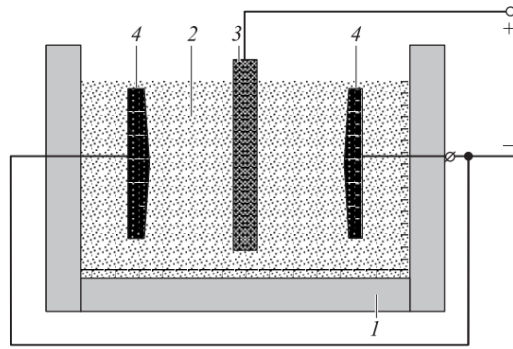
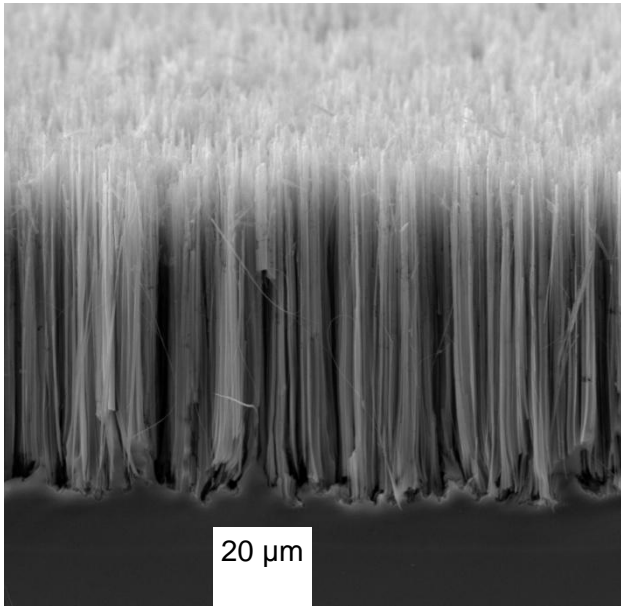


Research (What is it about?)	Pulsed formation changes the parameters of porous silicon
UNN authors	<i>Demidov E., Abrosimov A., Demidova N., Karzanov, V.</i>
We find (The result)	It is demonstrated that photoluminescence spectrum and conductivity of porous silicon change if pulsed anodic mode of its formation is used
Abstract	<p>Being one of the basic materials of modern electronics, monocrystalline silicon is not a radiation material as such. However porous silicon which can be prepared by electrochemical etching of monocrystalline silicon in hydrofluoric acid (HF) solutions has a perceptible yield of photoluminescence. Porous silicon is a three-phase system of nanoscale silicon fibers and grains, coated by a silicon oxide layer and air between them. The unwanted broad photoluminescence band in it is due to a large spread in the size of silicon grains. It is of interest to reduce this spread in order to narrow the photoluminescence spectrum and to increase the quantum yield of such radiation. Up to now all attempts to achieve this result concerned a stationary etching process.</p> <p>We have studied the influence of the pulsed modes of formation of porous silicon with the periods of 1÷8 seconds at the parameters of porous silicon. We find that the biggest increase in luminescence, by a factor of 2.5 compared with the continuous mode, takes place at a modulation period 1 s. We also find a higher conductivity of porous silicon layers obtained in the pulsed mode and an increase in conductivity with increasing the modulation period in a 1÷8 seconds range.</p>

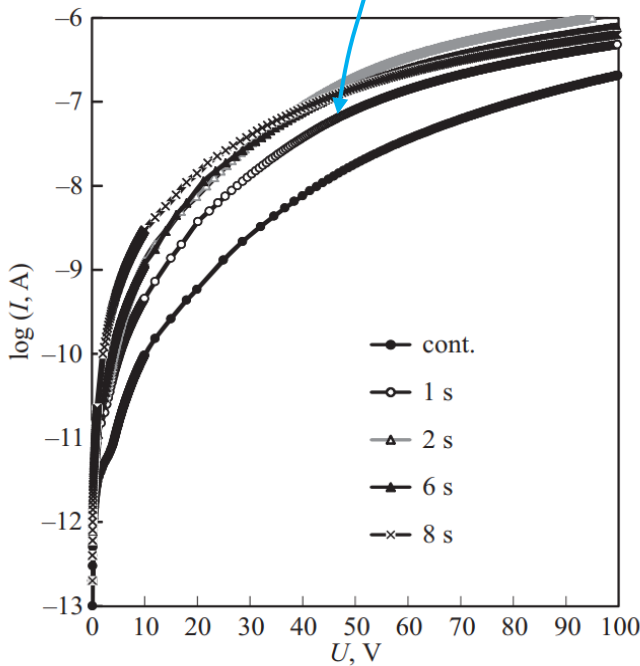
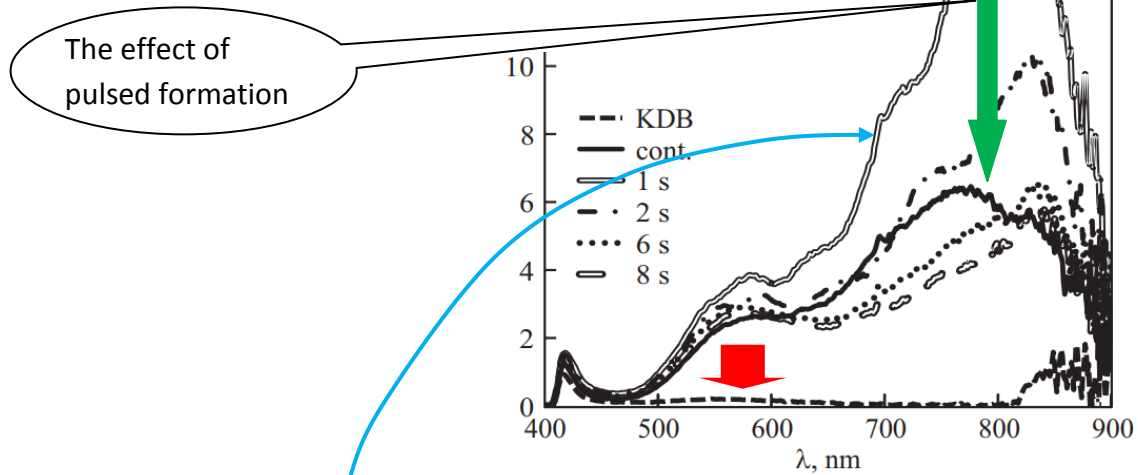
Representative articles 2017-2018, quartiles	1. <i>Demidov E.S., Abrosimov A.S., Demidova N.E., Karzanov, V.V.</i> Effect of the parameters of pulsed anodic formation of porous silicon on its luminescent, paramagnetic, and electrotransport properties. <i>Physics of the Solid State</i> . 59(2) , 251-253 (2017).	Q4
Q-index (Qi) for the result		1
high green		

In collaboration	–
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Electrochemical etching of silicon and a sample of porous silicon structure: 1 – fluoroplastic cup, 2 – HF electrolyte, 3 – silicon anode, 4 – platinum cathodes.

Photoluminescence spectra of porous silicon at various periods of etching. Red arrow refers to the spectrum of monocrystalline silicon anode (KDB).



Current–voltage characteristics of the diode structures with a layer of porous silicon, formed under different modes of anodic current modulation.

Blue arrow connects different characteristics at the same (minimum) period of modulation.