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Title

Fluorescence properties of 'as grown' and oxidized silicon nanoparticles

Permalink

<https://escholarship.org/uc/item/97k6128c>

Journal

BIOPHYSICAL JOURNAL, 80(1)

ISSN

0006-3495

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Publication Date

2001

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Peer reviewed

Dean A Eckhoff, Nicholas P Barry, Osman Akcakir, Enrico Gratton, Joel Therrien, Gennadiy Belomoin, and Munir H Nayfeh.

Fluorescence properties of "as grown" and oxidized silicon nanoparticles.

45th Annual Meeting of the Biophysical Society, Boston, Massachusetts, 2001.

Biophys J. 2001; 80(1 Pt 2): 363a.

Abstract

The recent introduction of nanocrystalline silicon particles as a new class of fluorescent markers has sparked intense excitement in the biological community and beyond. These particles have been shown to have good photostability, relatively small size (~1-2nm), strong fluorescence, and low toxicity, all of which make them excellent candidates for use in biological environments. The nanoparticles have the advantage that they can be tailored via their particle size and level of oxidation to exhibit a wide range of fluorescence characteristics. In this work, we study the excitation, emission, and absorption spectra of 3 samples differing in their level of oxidation. We observed a time evolution in the fluorescence, which appears to be correlated with the level of oxidation and occurs over a time scale of 1 to 2 months. For the strongly oxidized sample, there is little to no change over time, while for the mildly oxidized and unoxidized samples, the fluorescence generally increased substantially with time. In addition, we will discuss our efforts to derivatize the nanoparticles for subsequent attachment to DNA. We are interested in any changes in the fluorescence that may occur upon attachment of the linkers. This should help to shed further light on the influence of surface effects on the nanoparticle fluorescence. This work is supported by NIH PHS 5 P41-RRO3155 and NIH Molecular Biophysics Training Grant.