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**Photo-induced structural transformations and non-linear photoluminescence in nanocrystalline silicon silicon dioxide superlattices** BORIS KAMENEV, LEONID TSYBESKOV, HAIM GREBEL, NJIT — Recent reports on optical gain in Si nanocrystals have stimulated attention to linear and non-linear optical properties of these nanostructures. Usually, these measurements are performed using a nanosecond pulse of UV light with energy density up to $1 J/cm^2$. In this work, we study Si nanocrystal photo-induced heating by measuring Stokes and anti-Stokes components in Raman scattering and calculate sample thermal conductivity. The estimated threshold for the photo-induced structural transformations (i.e., Si nanocrystal melting) is calculated and measured to be in the range of $\sim 10$ $mJ/cm^2$. We observe at least two types of photo-induced structural modifications in Si nanocrystals (e.g., nanocrystal merge and nanocrystal amorphization) and discuss their impact on the sample light-emitting properties.

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