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Increase of the Photoluminescence efficiency of PbS Nanosheets by surface passivation. ANTARA DEBNATH ANTU, None — Semiconductor nanosheets, the most promising class of nanostructured materials for future application in miniaturized optoelectronic devices, photonic circuits and can offer sustainable solutions to current energy problems. Methods to grow thin vertically aligned PbS nanosheets have recently emerged. They have revealed some novel properties, such as highly efficient carrier multiplication, long photoluminescence lifetime, enhanced optical absorption, extremely narrow emission spectra and they are exceptionally radiative/bright. We show that the luminescence efficiency of thin PbS nanosheets can be improved upto 27% by passivating into a Trioctylphosphine (TOP) solution. Electron-hole photo-generation and oxidative dissolution combined with surface passivation by the lead-coordinating ligand are essential elements to improve the luminescence efficiency. The results suggest that presence of Trioctylphosphine (TOP) into colloidal thin PbS nanosheets indicating longer photoluminescence lifetime as well as better photoluminescence efficiency depending on the time. We also have extended our research by doing time and temperature dependent comparison between flat and vertical TOP treated Nanosheets to explore their different characteristics.

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None

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