thus are hydrophilic. However, solution-processible optoelectronics demands hydrophobic inks, including conductive polymers; thus, further applications of carbon dots in such devices are highly limited. In this work, the amphiphilic carbon dots are developed and proposed to convert the UV spectral range of sun radiation into visible light via energy down-conversion.

The amphiphilic carbon dots were synthesized by solvothermal method using amines and organic acids as precursors dissolved in acetylacetone. In this case, the solvent not only facilitates the reaction of the precursors as media, but also participates in the formation of carbon dots. The morphology and optical properties of synthesized carbon dots were studied in detail. These nanoparticles can be efficiently redissolved in a set of polar and nonpolar solvents such as tetrachloromethane, chloroform, isopropanol, and water. The energy of optical transitions while changing the solvent is almost the same; moreover, the photoluminescence quantum yield is largest for nonpolar solvents. This observation opens an opportunity to use these carbon dots to fabricate photoactive functional films based on them for the improvement of the working parameters of optoelectronic devices based on perovskites.

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Structure and electronic properties of layered Ge-Sb-Te based alloys

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Currently, with the increasing demands for modern storage media, such as flash memory (flash-memory) and hard disks based on magnetic recording, there is a failure of these types of storage media. This is mainly due to the insufficient number of write and erase cycles, the speed of writing and reading information, low radiation resistance, etc. [1-3]. In this regard, the expected receiver of a new generation of information carriers are non-volatile phase memory elements (PCM - Phase Change Memory) based on chalcogenide glassy semiconductors (CGS) [4].

Chalcogenide glassy semiconductors have unique properties. One of these properties is the ultrafast reverse phase transition of their structure from an amorphous to a crystalline state under the action of an electric or light pulse, which differ significantly in electrical and optical properties. It is known that chalcogenide semiconductors of the Ge-Sb-Te system of compositions $Ge_1Sb_2Te_4$, $Ge_2Sb_2Te_5$, $Ge_3Sb_2Te_6$ in the crystalline state have a layered structure with a van der Waals force of interaction between layers, which allows them to be exfoliate into two-dimensional crystals with a controlled number of layers [5,6].

In this work, an integrated approach was applied to study the structure and electronic properties of layered systems based on the Ge-Sb-Te compound.