

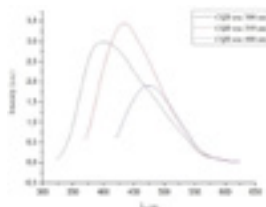
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Synthesis of carbon quantum dots with tunable luminescenceSvetlana A Smagulova, Alexandra E Tomskaya, Marfa N Egorova and Albert N Kapitonov
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Chemically synthesized graphene oxide (GO) has fluorescent properties due to the presence of oxygen functional groups. The presence of those groups such as carboxyl, hydroxyl, epoxy, etc. contributes to the appearance of structural defects and opening of band gap in GO. In this regard GO fluoresces in the range of wavelengths from ultraviolet to near infrared region. There are some methods of modifying the structure of the GO that change the photoluminescence spectrum and give rise to electroluminescence, for example, some authors associate the appearance of the electroluminescence with the formation of quantum dots of GO. Change of the emission wavelength depending on the photoexcitation energy has great potential for the creation of OLED phosphors, because modern phosphors can emit only a specific wavelength. But obtaining electroluminescence of GO is difficult due to structural defects on the plane and the edges of GO flakes, which prevent efficient charge transport. Current interest is the synthesis of new carbon material, which would have the same fluorescent properties as well as GO and have the defect-free structure. In this paper we report the synthesis of carbon quantum dots (CQDs) by hydrothermal treatment of the carbon precursor (glucose, citric acid, and gelatin) in the aqueous ammonia. The synthesized CQDs solution has oxygen groups that are drawn into the mechanism of luminescence of the GO. CQDs with lateral sizes around ~ 30-100 nm were obtained using a special method of hydrothermal treatment. The luminescent properties of CQDs change with a decrease of the lateral size of flakes and with the increasing of oxidation degree: The increasing of intensity of the emission spectrum and narrowing of the emission spectrum is observed. The photoluminescence spectrum CQDs with increasing of excitation wavelength shifts towards the red wavelengths. Furthermore, the analysis of growth of CQDs depending of the processing time, the concentration of the original solution and temperature was carried for finding optimal luminescent characteristics of CQDs.

**Biography**

Svetlana A Smagulova is the Chief Scientist, Head of "Graphene Nanotechnology" Laboratory at Institute of Physics and Technologies of North-Eastern Federal University, Yakutsk and her field of scientific interests are the creation and research of new materials based on graphene: A suspension of (graphene oxide, graphene, fluorographene), film, paper, layered structures, hybrid material, graphene structures with quantum dots, composite materials (polymers, rubber with the addition of graphene oxide). Also, the development of technologies for the creation of electronic devices based on graphene: Humidity sensor based on graphene and graphene oxide, electric double layer capacitors, strain gauges. The use of graphene in medicine: Development of test systems for DNA diagnostics of hereditary diseases based on graphene oxide; working out and creation of graphene-based aptasensor for rapid analysis of thrombin in the blood.

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