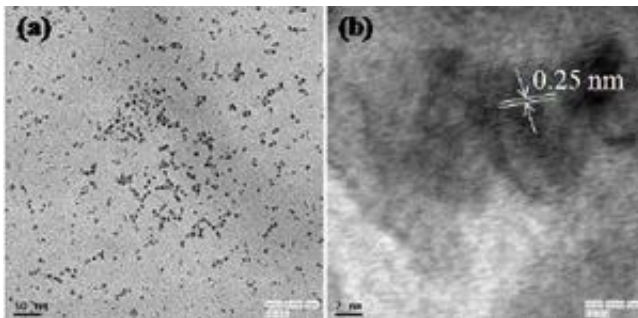


C-dot research has potential for improved bioimaging, medical diagnostics

September 14 2012



Typical transmission electron microscopy (TEM) images of Carbon dots. Credit: IOP / STAM

Work led by Amita Pathak at the Indian Institute of Technology has produced water-soluble C-dots that selectively emit light across the entire visible range without any surface coating. The properties of these new C-dots make them ideal for a variety of bioimaging applications and for medical diagnostics.

Carbon dots (C-dots) are light-emitting (luminescent) nanoparticles that can be used to track biological processes inside cells. They are less toxic than similar alternatives, making them more suitable for use in live biological systems, but the light-emitting properties of those currently made are not ideal.

A variety of approaches have been used to make C-dots, but most

require coating of the particles with other molecules to achieve useful luminescence. Now, work led by Amita Pathak at the Indian Institute of Technology has produced water-soluble C-dots that selectively emit light across the entire [visible range](#) without any surface coating.

The researchers produced these C-dots by breaking down the carbohydrate dextrin with microwaves. The resulting C-dots emitted different colours of light when excited by specific wavelengths, even without coating them. Exactly how this multi-coloured luminescence arises is unclear, but it allows precise control of the [light emission](#) that can be tailored to specific needs.

To ensure that the C-dots were not toxic, the team added different concentrations of the nanoparticles to [cultured cells](#). After three days, they determined how many cells had survived. Increasing concentrations of C-dots made little difference to [cell survival](#), showing that the C-dots are not toxic and could therefore be used in live tissue.

The properties of these new C-dots make them ideal for a variety of bioimaging applications and for medical diagnostics. The same researchers have already begun to look at how they may be used to investigate interactions between drugs and cells.

More information: Nagaprasad Puvvada, B N Prashanth Kumar, Suraj Konar, Himani Kalita, Mahitosh Mandal and Amita Pathak (2012) "Synthesis of biocompatible multicolor luminescent carbon dots for bioimaging applications" *Sci. Technol. Adv. Mater.* Vol. 13 p. 045008. DOI: [dx.doi.org/10.1088/1468-6996/13/4/045008](https://doi.org/10.1088/1468-6996/13/4/045008)

Provided by National Institute for Materials Science

Citation: C-dot research has potential for improved bioimaging, medical diagnostics (2012, September 14) retrieved 27 April 2024 from <https://phys.org/news/2012-09-c-dot-potential-bioimaging-medical-diagnostics.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.