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Two-photon absorption spectroscopy of CuInS2 quantum dots

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Colloidal semiconductor nanocrystals or quantum dots (QDs) are nanomaterials that exhibit a strong quantum confinement effect, which causes the appearance of size dependent optical properties. Among these properties, we can cite high molar absorptivity, high fluorescence quantum yield, exceptional multiphoton absorption, and strong electron-phonon coupling. Because of these remarkable features, QDs are of great technological interest since they have been used in several applications, such as solar and photovoltaic cells, luminescent biolabels, inkjet printing light-emitting devices, displays, and RGB devices. To explore the full potential of these materials and to screen them to the most appropriate application, it is important to obtain a quantitative understanding of their linear and nonlinear optical (as two-photon absorption) properties. For that, the aim of this work was investigate the 2PA features of water-soluble CuInS2 quantum dots by using the open-aperture femtosecond Z-scan technique. The 2PA cross-section values along the entire spectral region measured (2hν = 3.1 to 5.0 eV) are in the order of 102-103 Goeppert– Mayer units. By means of a theoretical model based on parabolic effective-mass approximation, we modeled the 2PA cross-section spectrum.

Tipo de Apresentação

Poster

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