

11

A Comparative Study of Optical Properties of Thin Films of MPS-encapsulated CdS Quantum Dots and SiO₂/MPS-encapsulated CdS Quantum Dots Mixture *

© Kenan Koc

Department of Physics, Yildiz Technical University,
34220 Istanbul, Turkey

e-mail: kockenan@gmail.com, kkoc@yildiz.edu.tr

Received October 04, 2019

Revised October 04, 2019

Accepted October 28, 2019

The aim of this study is to investigate the optical properties of thin films of MPS-encapsulated CdS quantum dots (QDs) and SiO₂/MPS-encapsulated CdS QDs mixture. For this purpose, SiO₂ sol and colloidal MPS-encapsulated CdS QDs were mixed and then deposited on a glass substrate by spin coating. Also, the spin-coating method was used to deposit the colloid-produced MPS-encapsulated CdS QDs and in this way the QDs were self-assembled onto the glass substrate. The films were heat treated at 150°C under N₂ atmosphere. The optical properties of the films were characterized by UV-Vis absorption spectrophotometer and NKD spectrophotometer measurements. The refractive index and thickness of the films were calculated by fitting the measured data in a Drude-Lorentz model. The refractive index values were found 1.90 and 1.51 for the thin films of the MPS-encapsulated CdS QDs and SiO₂/QDs mixtures, respectively. According to this result, the refractive index value of the SiO₂/CdS QDs mixture thin film is close to the glass substrate and such films may be a good candidate for planar luminous solar concentrators.

Key words: optical properties, quantum dots, thin films.

* Полный текст статьи опубликован в „Optics and Spectroscopy“
V. 127 N 6 2019.