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TWO-PHOTON FLUORESCENT MOLYBDENUM DISULFIDE DOTS FOR TARGETED PROSTATE CANCER IMAGING IN THE BIOLOGICAL II WINDOW

Carrie Sweet, Avijit Pramanik, Stacy Jones, and Paresh C. Ray

Department of Chemistry and Biochemistry, Jackson State University, Jackson, Mississippi, USA

Abstract: Two-dimensional (2D) transition metal dichalcogenides are promising building blocks for use in next-generation optoelectronics and photonics applications. Molybdenum disulfide (MoS_2) in particular shows great promise due to both its sizable band gap and the enhanced edge effects and quantum confinement of its quantum dots (QDs). Water-soluble photoluminescent MoS_2 QDs were synthesized by a facile bottom-up hydrothermal approach from sodium molybdate and L-cysteine precursors. These quantum dots exhibit a strong blue emission at 430 nm under ultraviolet irradiation. In addition, MoS2 QDs show tunable single-photon fluorescence with a wide range of excitation wavelengths. Future work will go into measuring the two-photon optical properties of these QDs as well as testing its cytotoxicity with the goal of directly imaging cancer cells in vivo using two-photon fluorescence methods.

Keywords: Molybdenum disulfide; quantum dots; fluorescence; two-photon fluorescence; biological II window; prostate cancer cell; targeted cell bioimaging

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